CLOSURE REPORT
TEMPORARY ACCUMULATION AREA (TAA) 31A
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

Environmental Remedial Action
Contract No. N62474-98-D-2076
Contract Task Order 0024

Document Control Number 5225
Revision 0

January 7, 2003

Submitted to:

U.S. Department of the Navy
Southwest Division
Naval Facilities Engineering Command
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San Diego, California 92132-5190

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Abbreviations and Acronyms

BNI	Bechtel National Inc.
BRAC	Base Realignment and Closure
CA LUFT	California Leaking Underground Fuel Tank
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CRDL	contract required detection limit
DO	delivery order
DSA	drum storage area
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
HI	hazard index
HSP	Health and Safety Plan
IT	IT Corporation
JEG	Jacobs Engineering Group Inc.
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LDC	Laboratory Data Consultants
m/z	mass-to-change
MCAS	Marine Corps Air Station
MDL	method detection limit
mg/kg	milligram per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NFA	no further action
OHM	OHM Remediation Services Corp.
PR	preliminary review
PRG	Preliminary Remediation Goal
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDL	reporting detection limit
RFA	RCRA facility assessment
RPD	relative percent difference
RRF	relative response factor
SIM	selected ion monitoring
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
SWMU	Solid Waste Management Unit
TAA	temporary accumulation area
TCL	target analyte compound
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
VSI	Visual Site Inspection

Abbreviations and Acronyms (Cont.)

%D	percent difference
%R	percent recovery
µg/kg	micrograms per kilogram

1.0 Introduction

This addendum closure report summarizes the confirmation soil sampling activities performed at the former Temporary Accumulation Area (TAA) 31A Site at the Marine Corps Air Station (MCAS) El Toro (hereinafter referred to as the "Station"), California. IT Corporation (IT) performed the work for the Southwest Division Naval Facilities Engineering Command (SWDIV) under EFA West Contract No. N62474-98-D-2076, Contract Task Order (CTO) 0024.

The Station is located approximately 45 miles southeast of the city of Los Angeles in Orange County, California, 1 mile north of the intersection of Interstate 5 (Santa Ana) and Interstate 405 (San Diego) freeways. The Station covers approximately 4,738 acres.

Former TAA 31A is located in the northwestern section of the Station, as shown on Figure 1-1. Former TAA 31A consists of a concrete pad with a six-inch concrete berm and a one-foot deep sump that was used for storage of waste that were generated from Building 31, a former utilities shop. TAA 31A is located approximately 40 feet northwest of Building 31. TAA 31A is located near the boundaries of the former Installation Restoration Program (IRP) Site 15 as shown in Figure 1-2.

Former TAA 31A, also known as SWMU 272, was inspected and sampled during the Resource Conservation and Recovery Act Facility Assessment (RFA) and reported in the *Final RCRA Facility Assessment (RFA) Report, Marine Corps Air Station El Toro, California (Jacobs Engineering Group Inc., [JEG] 1993)*. Soil samples were collected from one 60-foot angle boring (272A1) during the RFA field-sampling visit. The RFA documentation (JEG 1993) recommended *"no further action"* (NFA) based on the field sampling activities at SWMU 272.

The Station closed on July 1, 1999 in accordance with the Base Realignment and Closure Act of 1993 (BRAC III). Former TAA 31A is located within a parcel designated for future use as Open Space: Sports Park according to the Great Park Land Use Plan that was issued by the City of Irvine in June 2002. The Great Park Land Use Plan is provided in Appendix B.

Ground water conditions have been investigated in the vicinity of TAA 31A during the investigation IRP Site 15. Well 15_DBMW51 is located approximately 75 feet north of TAA 31A. This well is screened at 125-165 feet below ground surface in the "Shallow" groundwater unit. Groundwater is located at a depth of approximately 110 feet

(CDM, 2002). The well has been sampled quarterly since 1996 and analyzed for VOCs. Based on the results of the March 2002 round of sampling, VOCs were not detected above laboratory reporting levels for well 15_DBMW51.

In December 2001, a *Closure Report for Solid Waste Management Unit 272, Temporary Accumulation Area 31A, Marine Corps Air Station, El Toro, California* was submitted to the Department of Toxic Substances Control (DTSC), Region 4 using historical information from the RFA and IRP Site 15. A copy of the Closure Report for TAA 31A is included in Appendix A.

During a site visit at various TAA sites on August 27, 2002, representatives from SWDIV, Station, IT and the DTSC visited former TAA 31A site and during the site visit it was mutually agreed that one hand auger soil boring should be advanced in close proximity to the one foot deep TAA sump to collect two soil samples at a depth below the TAA sump, 30 inches and 48 inches below ground surface.

This addendum report includes a copy of December 2001 Closure Report for SWMU 272, former TAA 31A which provides all the historical background information from the RFA, and IRP Site 15. Also, included evaluation of analytical results from recent soil sampling activities and screening level risk assessment for TAA 31A site.

Based on the confirmation soil sampling data and the results of the risk assessment calculations, which resulted in net carcinogenic risk of less than 10^{-6} for the residential scenario and the industrial scenario for TAA 31A (SWMU 272) site. Also, the summed non-cancer hazard index for soil under the potential future residential scenario after subtracting background was less than 1.0. Therefore, former TAA 31A (SWMU 272) should be identified as "closed" in next Base Realignment and Closure Business Plan Update.

1.1 Regulatory Background and Cleanup Goals

The closure activities at former TAA 31A were completed in accordance with the appropriate federal and state requirements. Former TAA 31A is characterized as "*hazardous waste accumulation areas*" according to the Code of Federal Regulations (CFR), Title 40, Part 262.34, and the California Code of Regulations (CCR), Title 22, Section 66262.34. Because hazardous wastes have been stored at the site, closure of former TAA 31A is also subject to federal and state regulations for closure of less than 90 days hazardous waste management facilities (CFR 40, part 264, Subpart G; and CCR 22, Section 66264, Article 7, respectively).

The cleanup goals established for former TAA 31A are based on the following:

Soil

- United States Environmental Protection Agency (EPA) Region IX Preliminary Remediation Goals (PRGs) dated November 1, 2002 for residential land use for organic contaminants
- Background concentrations for metals contaminants (Bechtel National Inc. [BNI], 1996b)
- 5,000-milligrams per kilogram (mg/kg) concentration limit for total petroleum hydrocarbons (TPH)-purgeable
- 10,000-mg/kg concentration limit for TPH-extractable.

2.0 Field Activities

The following subsections describe the field activities that were performed by IT at former TAA 31A. Field activities were conducted in accordance with the approved *Final Supplemental Work Plan* (OHM, 1997a) and approved *Revised Addendum to the Draft Supplemental Work Plan, Marine Corps Air Station El Toro, California* (IT, 2002). Field activities conducted at former TAA 31A included confirmation soil sampling as per August 27, 2002 site visit.

2.1 Confirmation Soil Sampling

Per August 27, 2002 site visit, two confirmation soil samples were collected on November 12, 2002, from one hand-auger location, within one feet from the sump corner on the northwest side of TAA 31A. A total of 2 soil samples were collected from the hand-auger boring location. The location of the hand-auger boring is provided on Figure 2-1. Photo log of TAA 31A is included in Appendix C.

Soil samples were collected in standard stainless steel sleeves at two different depths: 30 and 48 inches below ground surface (to make up for sump depth of one foot). Details on the analytical methods, results, data quality assessment, and data validation are discussed in Section 3. Field quality assurance/quality control samples were collected and are also discussed in Section 3.

3.0 Sampling Analytical Results and Data Quality Assessment

The objective of confirmation soil sampling and selected analytical methods was to provide analytical data to characterize the soil condition adjacent to former TAA 31A. The sampling methodology, analytical methods, analytical results, and interpretation of confirmation soil sampling have been performed in accordance with the analytical strategy presented in the DTSC-approved *Final Supplemental Work Plan* (OHM, 1997a) and approved *Revised Addendum to the Draft Supplemental Work Plan, Marine Corps Air Station El Toro, California* (IT, 2002) and are described in the following text.

The laboratory analyses were performed according to test methods specified in EPA Solid Waste-846 (Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, June 1997) and California Leaking Underground Fuel Tank (CA LUFT) Manual (State Water Resources Control Board, 1989). The test methods used for analyses were selected on the basis of their ability to detect the chemicals of potential concern with suitable detection limits to verify that no release of chemicals occurred at former TAA 31A site and to provide data for assessment of risk to human health and the environment. A list of all the analytical methods that were performed for former TAA 31A is provided in Section 3.2.

All samples were analyzed by EMAX Laboratories, Inc., which is a State of California-certified and Naval Facilities Engineering Services Center-approved analytical laboratory.

3.1 Field Sampling Summary

3.1.1 Confirmation Soil Sampling

The sampling strategy for former TAA 31A focused on two aspects of the site: possible releases on the sub surface of the TAA or possible releases into the soil surrounding the TAA. Soil samples were collected and analyzed for the constituents contained in the wastes that may have been stored at former TAA 31A.

The sample location was selected based on a site visit by personnel from SWDIV, IT, and the DTSC on August 27, 2002. It was agreed that one soil boring advanced in close proximity to the one-foot deep TAA sump, to a depth below the sump (30 inches and 48 inches below ground surface). A total of 2 confirmation soil samples (sample numbers 818655-B3109 and 818655-B3110) were collected, within one feet from the sump corner on the northwest side, at former TAA 31A from 1 hand auger boring (TAA31A H1). The location of the hand auger boring is shown in Figure 1-2.

A hand auger was used to bore into the soil. Soil samples were collected at 30 and 48 inches. Following the collection of the soil samples, the excess soil was placed back in the open boreholes (no airborne volatile organic compounds (VOCs) were identified by the photoionization detector). The surface was then finished to match the existing ground surface.

3.1.2 Quality Control

Field quality assurance/quality control (QA/QC) samples were collected at the TAA site as follows:

- Equipment rinsate samples were collected at a frequency of 1 per day.
- Trip blank samples were collected at a frequency of 1 per sample cooler for coolers containing samples for volatile analysis

One equipment rinsate sample (sample number 818655-B3111) and one trip blank (sample number 818655-B3105) was collected on November 12, 2002.

EMAX Laboratories, Inc. performed the following laboratory QA/QC sample analysis:

- Laboratory control sample/sample duplicate analysis was performed at a frequency of 1 sample per batch.
- Laboratory matrix spike/spike duplicate sample analysis was performed at a frequency of 1 per 20 samples or per batch.
- Laboratory method blank analysis was performed at a frequency of 1 per batch.

3.1.3 Equipment Decontamination

Equipment used in the exclusion zone was decontaminated prior to removal from the site, as identified in the site specific Health and Safety Plan (HSP). The equipment used for collecting soil samples was decontaminated between each use. The hand auger assembly was washed in a typical three step procedure consisting of: decontaminating the equipment first using a brush in a bucket of Alconox^{TM} detergent and water; then a second bucket of water for immediate rinse; and again in a third bucket of analyte-free water for the final rinse.

3.2 Analytical Methods

Analytical methods were selected to encompass all the chemicals of potential concern at former TAA 31A. The following methods were performed to characterize samples collected from former TAA 31A:

- Volatile organic compounds (VOCs) by EPA Method 5035/8260B
- Semivolatile organic compounds (SVOCs) by EPA Method 8270C
- Total petroleum hydrocarbons (TPH) as gasoline by EPA Method 5035 and CA LUFT 8015 Modified
- TPH as diesel by CA LUFT 8015 Modified (extraction)
- Pesticides EPA Method 8081A
- Metals by EPA Method 6010B/7000.

Additionally, the Selected Ion Monitoring (SIM) technique was used on the following seven semivolatile organic compounds in order to achieve detection limits lower than the Region IX PRGs (EPA, 2002):

- Benzo(a)pyrene
- bis(2-Chloroethyl)ether
- Dibenzo(a,h)anthracene
- Hexachlorobenzene
- Indeno(1,2,3-cd)pyrene
- n-Nitrosodi-n-propylamine
- Pentachlorophenol.

SIM is a recognized gas chromatograph/mass spectrometer technique used to lower detection limits for organic compounds. As specified in EPA Method 8270B, semivolatile compounds are introduced into the gas chromatograph by direct injection. The components of the sample are separated by the gas chromatograph and detected by the mass spectrometer, which provides both qualitative and quantitative information.

For each component or compound separated by the gas chromatograph, the mass spectrometer produces a characteristic mass spectrum. The mass spectrometer ionizes the sample molecules and separates any resulting fragments by mass-to-charge (m/z) ratios. The fragmentation pattern is used to determine the structure of the original molecule. The intensity of one or more of the fragments is used to quantitate the identified compound.

Upon identification of a target compound by comparison of the acquired mass spectrum with the mass spectrum of a standard, EPA Method 8270B specifies a fragment or characteristic ion to use for quantitation of the analyte. Method 8270B requires that the mass spectrometer scan from 35 to 500 amu (m/z) every 1 second or less. In SIM, the entire mass range is not scanned. Typically, only a few m/z are monitored. As a result, the mass spectrometer is able to collect more data from a specific m/z, resulting in an improved signal-to-noise ratio, which in turn improves detection limits. There is, however, a practical limitation to the number of m/z that can be monitored at one time so that the total scan time does not exceed 1 second. As a result, the number of compounds that can be measured in a single SIM analysis is limited.

3.3 Laboratory Analytical Results

This section provides summary and assessment of the analytical results from the sampling performed at former TAA 31A. The analytical results for the confirmation soil samples at former TAA 31A with comparison to the station's background concentrations and PRGs are presented in Table 3-1. QC sample analytical data for former TAA 31A are presented in Table 3-2. The hard copies of the analytical results with QA/QC data obtained from EMAX Analytical Laboratory are included in Appendix D.

3.3.1 Soil Sample Analytical Results

Total Petroleum Hydrocarbons – TPH as gasoline was not detected above the laboratory reporting limits in any confirmation soil samples collected from TAA 31A. TPH as diesel was detected in one soil sample at a concentration of 93 mg/kg.

Volatile Organic Compounds – VOCs were not detected above the laboratory reporting limits in any confirmation soil samples.

Pesticides – Pesticide compounds were not detected above the laboratory reporting limits for all confirmation soil samples collected from former TAA 31A.

Semivolatile Organic Compounds – No SVOCs were detected above the laboratory reporting limits in the confirmation soil samples collected from former TAA 31A.

To ensure that the laboratory reporting limits were lower than the residential PRGs, the following seven SVOCs were analyzed using the SIM technique:

- Benzo(a)pyrene
- bis(2-Chloroethyl)ether

All samples were prepared and analyzed within EPA recommended holding times. The sample cooler was received intact and within the required temperature range of 4$\pm$2 degrees Celsius. All data are useable as qualified.

3.5 Data Validation

Analytical data were reviewed and validated in accordance with the EPA *National Functional Guidelines for Organic and Inorganic Data Review* (EPA, 1994). Laboratory Data Consultants (LDC), an independent data validation company, performed Level III and Level IV validation on the data. A hard copy of the LDC report is provided in Appendix E.

Laboratory analytical data were subjected to a four-stage process of evaluation: completeness checks, verification of hard copy and electronic results, validation of the data, and final evaluation based on the professional judgment of the project chemist.

The data were qualified by LDC to indicate whether the data has been affected by any deviation from the analytical protocols established in the Final Supplemental Work Plan (OHM, 1997a). Unusable data was qualified with an "R" (rejected). All other results were either unqualified (no flag), nondetected ("U" flag), nondetected with uncertainty in the report detection limits ("UJ" flag), or detected with uncertainty in the reported concentration ("J" flag).

Summary – All data associated with former TAA 31A were usable and acceptable as qualified. Overall precision and accuracy were met. The analytical results and associated qualifiers are summarized in Tables 3-1 and 3-2.

4.0 Risk Characterization and Hazard Index Calculation

This section briefly describes the approach used to estimate risk and summarizes the baseline screening level risk assessment results for former TAA 31A. A screening level risk assessment for human health was conducted following the guidance provided in the EPA Region IX PRGs Memorandum dated November 1, 2002 (EPA, 2002). The analytical results of IT confirmation soil boring and RCRA Facility Assessment (RFA) 60-foot angle boring conducted at former TAA 31A were used to calculate risks.

4.1 Physical Characteristics of Former TAA 31A

Based on the review of the RFA boring 272 A1 log, the subsurface lithology at former TAA 31A consists of primarily of silts, sands, and clays. These units appear typical of the channel and overbank deposits in comprising the Holocene deposits on the Tustin Plain. The depth to the groundwater in the vicinity of former TAA 31A is approximately 110 feet below ground surface (CDM, 2002).

4.2 Exposure Assessment

Former TAA 31A was used as a temporary hazardous waste storage area. Areas surrounding former TAA 31A are covered with gravel. The land use scenario is currently considered to be residential.

The Station officially closed on July 2, 1999 in accordance with the Base Closure and Realignment Act of 1993 (BRAC III). Former TAA 31A is located within a parcel designated for future use as Open Space: Sports Park according to the Great Park Land Use Plan that was issued by the City of Irvine in June 2002. The Great Park Land Use Plan is provided in Appendix B.

For screening purposes, the ingestion, dermal contact, and inhalation exposure pathways are assumed to be complete for former TAA 31A, as if the area were unpaved. Should the screening fail, further evaluation of the exposure pathways would be required. A site conceptual model for former TAA 31A is shown on Figure 4-1.

Under an industrial and/or residential land use scenario at former TAA 31A, workers, or humans could be potentially exposed to surrounding soil by ingestion, dermal contact, or inhalation of dust or volatilized contaminants. These are the same exposure pathways evaluated by the EPA PRGs (EPA, 2002). Figure 4-2 presents the potential migration pathways at former TAA 31A.

For the purposes of this risk screening evaluation, the residential scenario is used as the worst-case scenario. If the risk were acceptable for the residential land use scenario, the risk would also be acceptable for both the current and future land use scenarios.

4.3 Toxicity Assessment

The PRGs incorporate the toxicity values from the Integrated Risk Information System, the Health Effects Assessment Summary Tables, and the National Center for Environmental Assessment. Cancer PRGs incorporate cancer toxicity values and the noncancer PRGs incorporate the toxicity values for chronic health effects other than cancer (EPA, 2002). Both cancer risk and noncancer hazards were evaluated in this screening risk assessment.

4.4 Risk Characterization

The PRGs are concentrations calculated using standard exposure factors that are protective of humans, including sensitive groups, over a lifetime. These PRG concentrations pose acceptable cancer risk or non-cancer hazard under the exposure scenarios evaluated. Generally, a cancer risk of 10^{-6} and a non-cancer hazard index (HI) of 1.0 or less are considered acceptable levels of exposure. Therefore, the PRG concentrations are calculated to the lower end of the acceptable cancer risk range of 10^{-6} and to a non-cancer hazard index of 1.0.

Cancer risk is calculated by dividing the site concentration by the PRG for each chemical. The ratios are added and the sum is then multiplied by 10^{-6}. The hazard index is calculated by dividing the site concentration by the PRG for each chemical and adding the resultant ratios.

Although maximum concentrations for chemicals detected at the site are used for this risk screening, comparisons are not made to maximum detected background concentrations. To maintain a conservative estimate of background risk, the 95th quantile background concentrations calculated for the Station (BNI, 1996b) are used to calculate background contributions to cancer risk.

At former TAA 31A, only detected carcinogen in soil was chromium. However, chromium was not detected above established background concentrations. The summed cancer risk for soil under the potential future residential scenario after subtracting background is less than 10^{-6} (Table 4-1). The net cancer risk for the current industrial scenario after subtracting background is also less than 10^{-6} (Table 4-2).

Compounds that were detected at former TAA 31A that contribute to the non-cancer HI include aluminum, barium, beryllium, cobalt, copper, manganese, vanadium, and zinc. The summed non-cancer hazard index for soil under the potential future residential scenario after subtracting background is less than 1.0 (Table 4-1).

Summary

The site-related incremental cancer risk and non-cancer hazard index at former TAA 31A are acceptable for the following reasons:

- The net carcinogenic risk is less than 10^{-6} for the residential scenario and the industrial scenario.
- The summed non-cancer hazard index for soil under the potential future residential scenario after subtracting background is less than 1.0.

5.0 Conclusions and Recommendations

The following conclusions are based upon existing background information, previous field investigations, and IT's confirmation soil sampling analytical results and screening level risk assessment calculations:

- TAA 31A was inspected and sampled during the Resource Conservation and Recovery Act Facility Assessment (RFA) and reported in the Final RCRA Facility Assessment (RFA) Report, Marine Corps Air Station El Toro, California (Jacobs Engineering Group Inc., [JEG] 1993). During the RFA TAA 31A was identified as SWMU 272. Soil samples were collected from one 60-foot angle boring during the RFA field-sampling visit. The RFA documentation (JEG 1993) recommended "no further action" (NFA) based on the field sampling activities for TAA 31A.
- During a site visit to TAA 31A on August 27, 2002, representatives from SWDIV, IT and the DTSC established that one soil boring advanced in close proximity to the one foot deep TAA sump, to a depth below the TAA sump (30 inches and 48 inches below ground surface) would be sufficient to characterize the soil for site closure status at TAA 31A.
- On November 12, 2002, IT advanced one soil boring in close proximity to the TAA sump, to a depth below the one-foot deep sump (30 inches and 48 inches below ground surface). A total of two confirmation soil samples were collected, from one hand auger boring.
- The only detected carcinogen in soil included chromium (maximum concentration of 12.5 mg/kg), however chromium was detected below the Station's established background levels of 26.9 mg/kg for chromium. The detected chromium was evaluated to determine the risk associated with its presence. Compounds detected at former TAA 31A that were evaluated for non-cancer HI contribution include aluminum, barium, beryllium, cobalt, copper, manganese, vanadium, and zinc.
- The residential and industrial risk calculations for former TAA 31A resulted in a site-related net cancer risk less background risk of less than 10^{-6}. The residential and industrial non-cancer HI's less background risk was less than 1.0.

Based on the information provided, closure goals were achieved with respect to soil for former TAA 31A; since former TAA 31A (SWMU 272) is no longer used for storage of hazardous waste. Confirmation soil sampling was conducted at former TAA 31A (SWMU 272) to verify that concentrations of contaminants were at or below acceptable background or health-risk based concentrations. Therefore, former TAA 31A (SWMU 272) should be identified as “closed” in next Base Realignment and Closure Business Plan Update.

6.0 References

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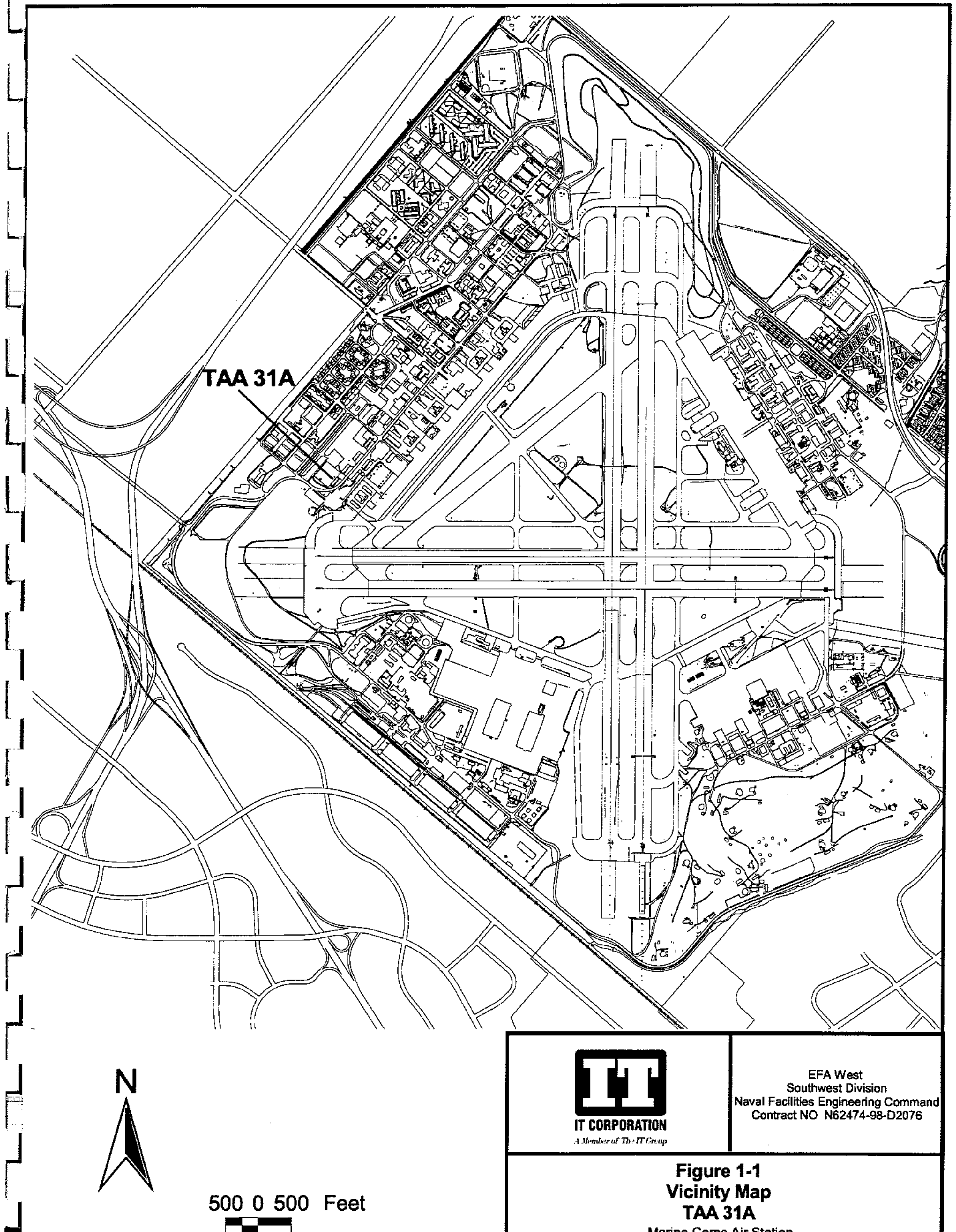
FIGURES



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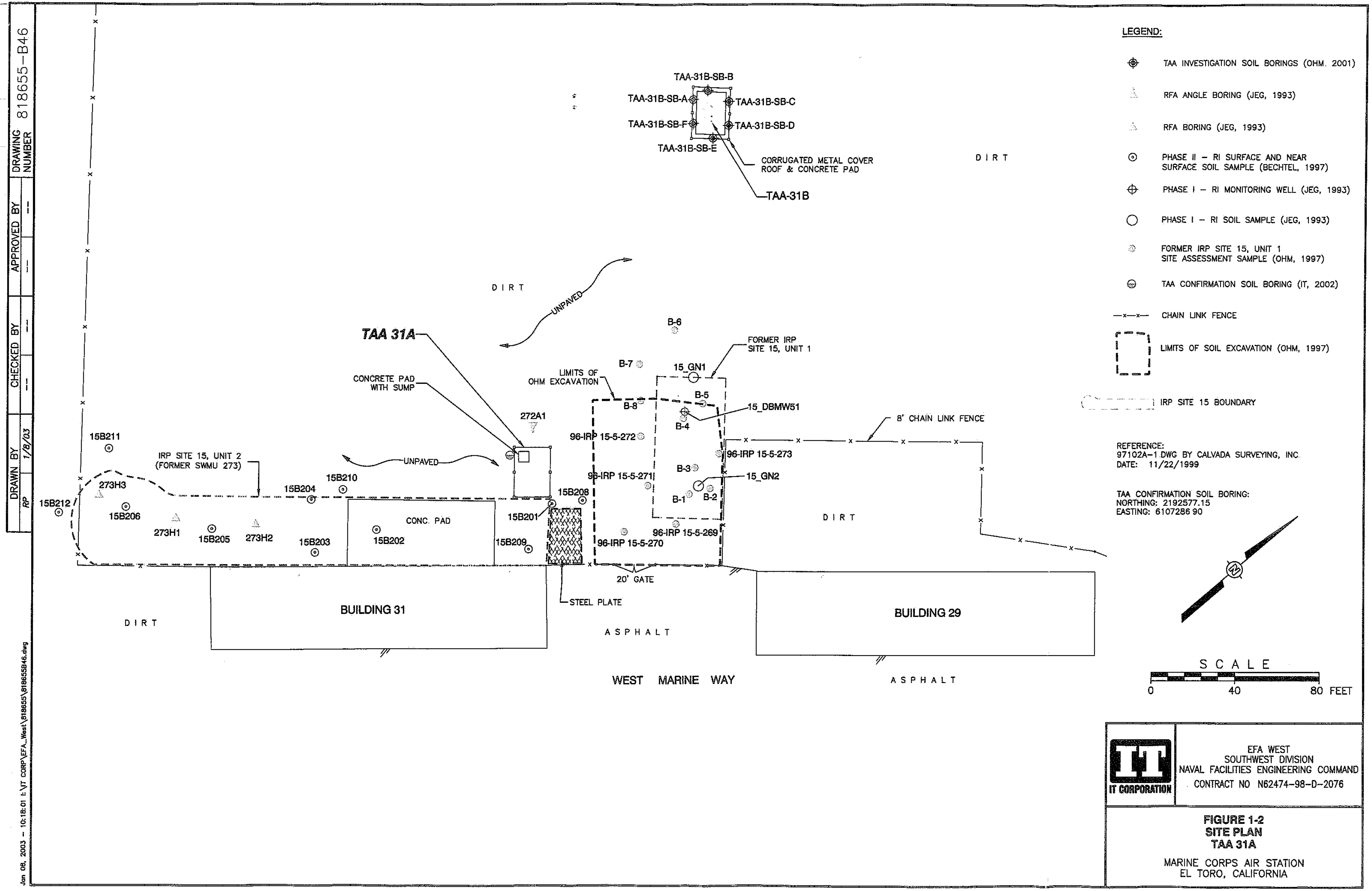
Naval Facilities Engineering Command
Contract NO N62474-98-D2076

Figure 1-1
Vicinity Map
TAA 31A
Marine Corps Air Station
El Toro, California



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EFA WEST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CONTRACT NO. N62474-98-D-2076

FIGURE 1-2
SITE PLAN
TAA 31A

MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

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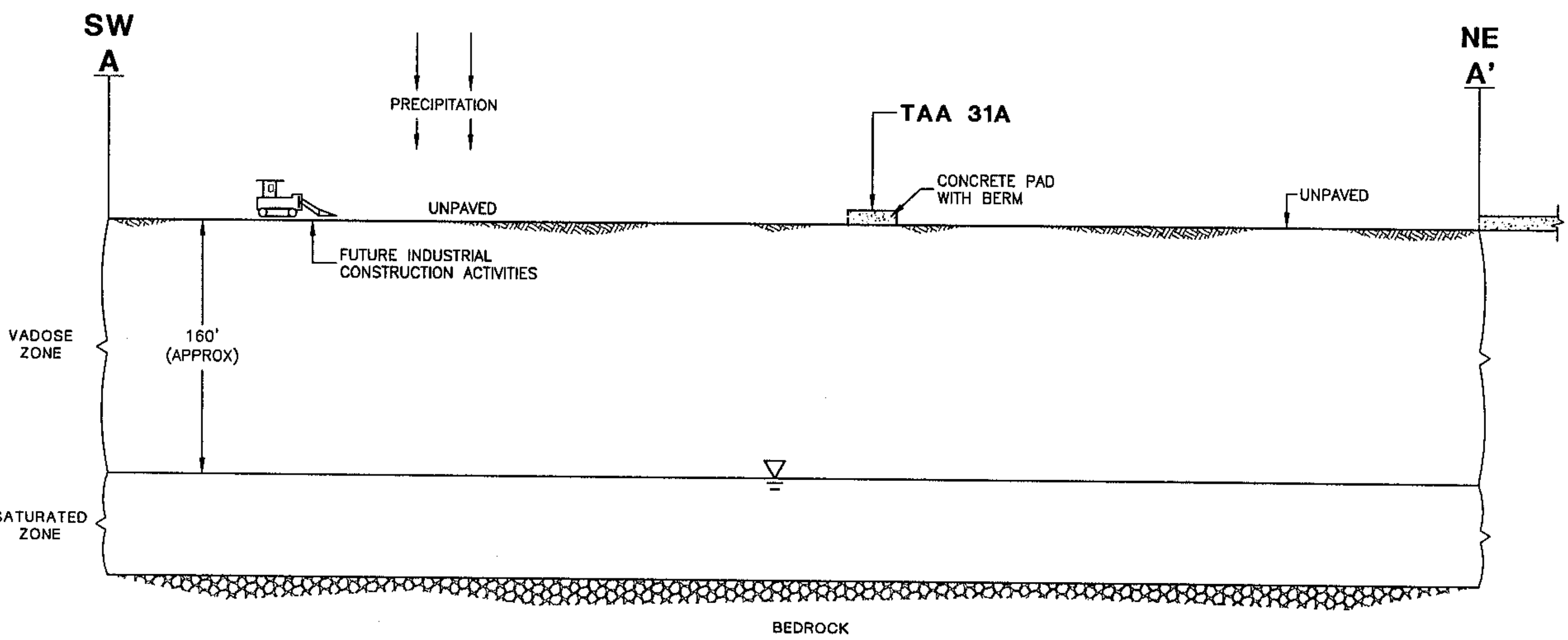

EXPLANATION:

RECEPTORS:

WORKERS

PATHWAYS:

GROUNDWATER

PRECIPITATION

REFERENCE:
103M2088.DWG

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EFA WEST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CTO 24

FIGURE 4-1

CONCEPTUAL SITE MODEL
TAA 31A

MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

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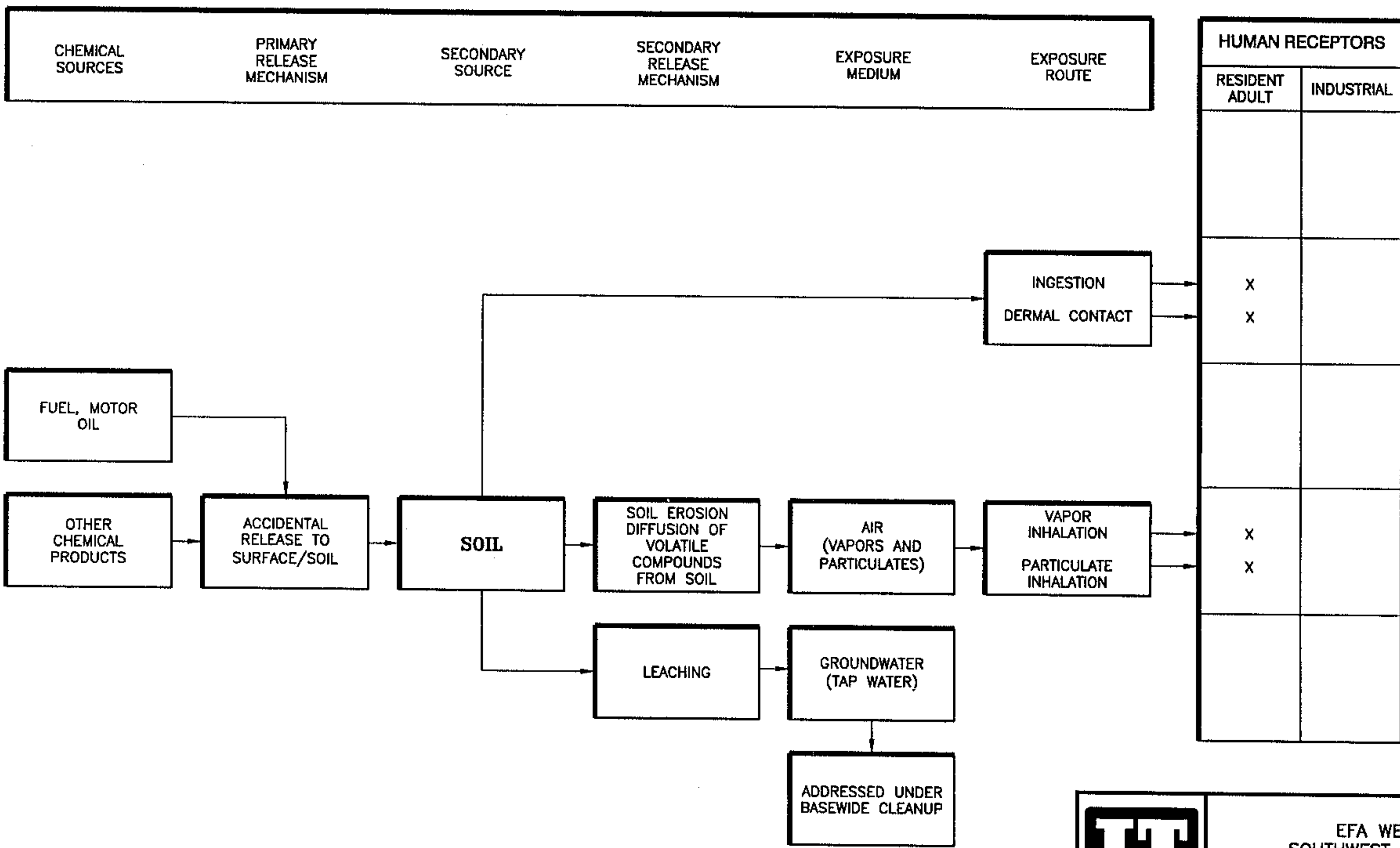

EXPLANATION:

X COMPLETE PATHWAY

REFERENCE:
103C2089.DXF

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NAVAL FACILITIES ENGINEERING COMMAND
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FIGURE 4-2
POTENTIAL MIGRATION PATHWAYS, EXPOSURE ROUTES AND RECEPTORS
TAA 31A
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

TABLES

Table 3-1
Summary of Analytical Results for Confirmation Soil Samples — TAA 31A

Sample Identification					818655-B3109	818655-B3110
Location Code					TAA31A	TAA31A
Date Sampled					11/12/02	11/12/02
Depth (feet below ground surface)					2.5	4
	Unit	Background	PRG Residential	PRG Industrial		
TPH						
Diesel	mg/kg	NE	NE	NE	11 U	93
Gasoline	mg/kg	NE	NE	NE	11 U	12 U
PESTICIDES						
4,4'-DDD	mg/kg	36.1	2.4	9.9	.0043 U	.0046 U
4,4'-DDE	mg/kg	145	1.7	7.0	.0043 U	.0046 U
4,4'-DDT	mg/kg	236	1.7	7.0	.0043 UJ	.0046 UJ
Aldrin	mg/kg	NE	0.029	0.10	.0022 U	.0023 U
Alpha-BHC	mg/kg	NE	0.090	0.36	.0022 U	.0023 UJ
Alpha-Chlordane	mg/kg	2.24	NE	NE	.0022 U	.0023 U
Beta-BHC	mg/kg	NE	0.32	1.3	.0022 U	.0023 U
Delta-BHC	mg/kg	NE	NE	NE	.0022 U	.0023 U
Dieldrin	mg/kg	19.9	0.030	0.11	.0043 U	.0046 U
Endosulfan I	mg/kg	0.179	370	3700	.0043 U	.0046 U
Endosulfan II	mg/kg	2.22	NE	NE	.0043 U	.0046 U
Endosulfan Sulfate	mg/kg	3.1	NE	NE	.0043 U	.0046 U
Endrin	mg/kg	2.22	18	185	.0033 UJ	.0034 UJ
Endrin Aldehyde	mg/kg	2.22	NE	NE	.0043 U	.0046 U
Endrin Ketone	mg/kg	NE	NE	NE	.0033 U	.0034 U
Gamma-BHC	mg/kg	NE	0.44	1.74	.0022 U	.0023 U
Gamma-Chlordane	mg/kg	2.7	NE	NE	.0022 U	.0023 U
Heptachlor	mg/kg	NE	0.11	0.38	.0022 UJ	.0023 UJ
Heptachlor Epoxide	mg/kg	NE	0.053	0.19	.0022 U	.0023 U
Methoxychlor	mg/kg	NE	300	3100	.022 UJ	.023 UJ
Toxaphene	mg/kg	NE	0.44	1.6	.11 U	.11 U
PCBS						
PCB-1016	mg/kg	NE	NE	NE	.054 U	.057 U
PCB-1221	mg/kg	NE	NE	NE	.054 U	.057 U
PCB-1232	mg/kg	NE	NE	NE	.054 U	.057 U
PCB-1242	mg/kg	NE	NE	NE	.054 U	.057 U
PCB-1248	mg/kg	NE	NE	NE	.054 U	.057 U
PCB-1254	mg/kg	NE	NE	NE	.054 U	.057 U
PCB-1260	mg/kg	NE	NE	NE	.054 U	.057 U

Table 3-1
Summary of Analytical Results for Confirmation Soil Samples — TAA 31A

Sample Identification					818655-B3109	818655-B3110
Location Code					TAA31A	TAA31A
Date Sampled					11/12/02	11/12/02
Depth (feet below ground surface)					2.5	4
	Unit	Background	PRG Residential	PRG Industrial		
VOLATILES						
1,1,1-Trichloroethane	µg/kg	NE	1200000	1200000	5.3 U	5.3 U
1,1,2,2-Tetrachloroethane	µg/kg	NE	410	930	5.3 U	5.3 U
1,1,2-Trichloroethane	µg/kg	NE	730	1600	5.3 U	5.3 U
1,1-Dichloroethane	µg/kg	NE	510000<2800>	1700000	5.3 U	5.3 U
1,1-Dichloroethene	µg/kg	NE	120000	410000	5.3 U	5.3 U
1,2-Dichloroethane	µg/kg	NE	280	600	5.3 U	5.3 U
1,2-Dichloropropane	µg/kg	NE	340	740	5.3 U	5.3 U
2-Butanone	µg/kg	NE	NE	NE	53 U	53 U
2-Chloroethyl Vinyl Ether	µg/kg	NE	NE	NE	53 U	53 U
2-Hexanone	µg/kg	NE	NE	NE	53 U	53 U
4-Methyl-2-Pentanone	µg/kg	NE	NE	NE	53 U	53 U
Acetone	µg/kg	NE	1600000	6000000	53 U	53 U
Benzene	µg/kg	NE	600	1300	5.3 U	5.3 U
Bromodichloromethane	µg/kg	NE	820	1800	5.3 U	5.3 U
Bromoform	µg/kg	NE	62000	220000	5.3 U	5.3 U
Bromomethane	µg/kg	NE	3900	13000	5.3 U	5.3 U
Carbon Disulfide	µg/kg	NE	360000	720000	5.3 U	5.3 U
Carbon Tetrachloride	µg/kg	NE	250	550	5.3 U	5.3 U
Chlorobenzene	µg/kg	NE	150000	530000	5.3 U	5.3 U
Chloroethane	µg/kg	NE	3000	6500	5.3 U	5.3 U
Chloroform	µg/kg	NE	3600<940>	12000	5.3 U	5.3 U
Chloromethane	µg/kg	NE	1200	2600	5.3 U	5.3 U
Cis-1,2-Dichloroethene	µg/kg	NE	43000	150000	5.3 U	5.3 U
Cis-1,3-Dichloropropene	µg/kg	NE	780	1800	5.3 U	5.3 U
Dibromochloromethane	µg/kg	NE	1100	2600	5.3 U	5.3 U
Ethylbenzene	µg/kg	NE	8900	19000	5.3 U	5.3 U
Methyl Tert-Butyl Ether	µg/kg	NE	62000<17000>	160000	11 U	11 U
Methylene Chloride	µg/kg	NE	9100	21000	5.3 U	5.3 U
Styrene	µg/kg	NE	1700000	1700000	5.3 U	5.3 U
Tetrachloroethene	µg/kg	NE	1500	3400	5.3 U	5.3 U
Toluene	µg/kg	NE	520000	520000	5.3 U	5.3 U
Trans-1,2-Dichloroethene	µg/kg	NE	69000	230000	5.3 U	5.3 U

Table 3-1
Summary of Analytical Results for Confirmation Soil Samples — TAA 31A

Sample Identification					818655-B3109	818655-B3110
Location Code					TAA31A	TAA31A
Date Sampled					11/12/02	11/12/02
Depth (feet below ground surface)					2.5	4
	Unit	Background	PRG Residential	PRG Industrial		
Trans-1,3-Dichloropropene	µg/kg	NE	780	1800	5.3 U	5.3 U
Trichloroethene	µg/kg	NE	53	110	5.3 U	5.3 U
Vinyl Acetate	µg/kg	NE	420000	1400000	53 U	53 U
Vinyl Chloride	µg/kg	NE	79		5.3 U	5.3 U
Xylene, (Total)	µg/kg	NE	NE	NE	5.3 U	5.3 U
SEMI-VOLATILES						
1,2,4-Trichlorobenzene	µg/kg	NE	650000	3000000	360 U	380 U
1,2-Dichlorobenzene	µg/kg	NE	370000	370000	360 U	380 U
1,3-Dichlorobenzene	µg/kg	NE	16000	63000	360 U	380 U
1,4-Dichlorobenzene	µg/kg	NE	3400	7900	360 U	380 U
2,4,5-Trichlorophenol	µg/kg	NE	6100000	62000000	900 U	950 U
2,4,6-Trichlorophenol	µg/kg	NE	6100<6900>	62000	360 U	380 U
2,4-Dichlorophenol	µg/kg	NE	180000	1900000	360 U	380 U
2,4-Dimethylphenol	µg/kg	NE	1200000	12000000	360 U	380 U
2,4-Dinitrophenol	µg/kg	NE	120000	1200000	900 U	950 U
2,4-Dinitrotoluene	µg/kg	NE	120000	1200000	360 U	380 U
2,6-Dinitrotoluene	µg/kg	NE	61000	620000	360 U	380 U
2-Chloronaphthalene	µg/kg	NE	4900000	23000000	360 U	380 U
2-Chlorophenol	µg/kg	NE	63000	240000	360 U	380 U
2-Methylnaphthalene	µg/kg	NE	NE	NE	360 U	380 U
2-Methylphenol	µg/kg	NE	3000000	31000000	360 U	380 U
2-Nitroaniline	µg/kg	NE	1700	18000	900 U	950 U
2-Nitrophenol	µg/kg	NE	NE	NE	360 U	380 U
3,3'-Dichlorobenzidine	µg/kg	NE	1100	3800	360 U	380 U
3-Nitroaniline	µg/kg	NE	NE	NE	900 U	950 U
4,6-Dinitro-2-Methylphenol	µg/kg	NE	NE	NE	900 U	950 U
4-Bromophenyl Phenyl Ether	µg/kg	NE	NE	NE	360 U	380 U
4-Chloro-3-Methylphenol	µg/kg	NE	NE	NE	360 U	380 U
4-Chloroaniline	µg/kg	NE	240000	2500000	360 U	380 U
4-Chlorophenyl Phenyl Ether	µg/kg	NE	NE	NE	360 U	380 U
4-Methylphenol	µg/kg	NE	310000	3100000	360 U	380 U
4-Nitroaniline	µg/kg	NE	NE	NE	900 U	950 U
4-Nitrophenol	µg/kg	NE	NE	NE	900 U	950 U

Table 3-2
Summary of Analytical Results for QC Samples —TAA 31A

Sample Identification Location Code Date Sampled	Unit	818655-B3111 Equipment Rinsate 11/12/02	818655-B3105 Trip Blank 11/12/02
TPH			
Diesel	mg/L	.094 U	NA
Gasoline	mg/L	.1 U	NA
PESTICIDES			
4,4'-DDD	µg/L	.19 U	NA
4,4'-DDE	µg/L	.19 U	NA
4,4'-DDT	µg/L	.19 U	NA
Aldrin	µg/L	.094 U	NA
Alpha-BHC	µg/L	.094 U	NA
Alpha-Chlordane	µg/L	.094 U	NA
Beta-BHC	µg/L	.094 U	NA
Delta-BHC	µg/L	.094 U	NA
Dieldrin	µg/L	.19 U	NA
Endosulfan I	µg/L	.094 U	NA
Endosulfan II	µg/L	.19 U	NA
Endosulfan Sulfate	µg/L	.19 U	NA
Endrin	µg/L	.094 U	NA
Endrin Aldehyde	µg/L	.19 U	NA
Endrin Ketone	µg/L	.094 U	NA
Gamma-BHC	µg/L	.094 U	NA
Gamma-Chlordane	µg/L	.094 U	NA
Heptachlor	µg/L	.094 U	NA
Heptachlor Epoxide	µg/L	.094 U	NA
Methoxychlor	µg/L	.94 U	NA
Toxaphene	µg/L	2.8 U	NA
PCBS			
PCB-1016	µg/L	.94 U	NA
PCB-1221	µg/L	.94 U	NA
PCB-1232	µg/L	.94 U	NA
PCB-1242	µg/L	.94 U	NA
PCB-1248	µg/L	.94 U	NA
PCB-1254	µg/L	.94 U	NA
PCB-1260	µg/L	.94 U	NA

Table 3-2
Summary of Analytical Results for QC Samples —TAA 31A

Sample Identification		818655-B3111	818655-B3105
Location Code		Equipment Rinsate	Trip Blank
Date Sampled		11/12/02	11/12/02
	Unit		
Trans-1,3-Dichloropropene	µg/L	5 U	5 U
Trichloroethene	µg/L	5 U	5 U
Vinyl Acetate	µg/L	50 U	50 U
Vinyl Chloride	µg/L	5 U	5 U
Xylene, (Total)	µg/L	5 U	5 U
SEMI-VOLATILES			
1,2,4-Trichlorobenzene	µg/L	9.4 U	NA
1,2-Dichlorobenzene	µg/L	9.4 U	NA
1,3-Dichlorobenzene	µg/L	9.4 U	NA
1,4-Dichlorobenzene	µg/L	9.4 U	NA
2,4,5-Trichlorophenol	µg/L	24 U	NA
2,4,6-Trichlorophenol	µg/L	9.4 U	NA
2,4-Dichlorophenol	µg/L	9.4 U	NA
2,4-Dimethylphenol	µg/L	9.4 U	NA
2,4-Dinitrophenol	µg/L	24 U	NA
2,4-Dinitrotoluene	µg/L	9.4 U	NA
2,6-Dinitrotoluene	µg/L	9.4 U	NA
2-Chloronaphthalene	µg/L	9.4 U	NA
2-Chlorophenol	µg/L	9.4 U	NA
2-Methylnaphthalene	µg/L	9.4 U	NA
2-Methylphenol	µg/L	9.4 U	NA
2-Nitroaniline	µg/L	24 U	NA
2-Nitrophenol	µg/L	9.4 U	NA
3,3'-Dichlorobenzidine	µg/L	9.4 U	NA
3-Nitroaniline	µg/L	24 U	NA
4,6-Dinitro-2-Methylphenol	µg/L	24 U	NA
4-Bromophenyl Phenyl Ether	µg/L	9.4 U	NA
4-Chloro-3-Methylphenol	µg/L	9.4 U	NA
4-Chloroaniline	µg/L	9.4 U	NA
4-Chlorophenyl Phenyl Ether	µg/L	9.4 U	NA
4-Methylphenol	µg/L	9.4 U	NA
4-Nitroaniline	µg/L	24 U	NA
4-Nitrophenol	µg/L	24 U	NA

Table 3-2
Summary of Analytical Results for QC Samples —TAA 31A

Sample Identification		818655-B3111	818655-B3105
Location Code		Equipment Rinsate	Trip Blank
Date Sampled		11/12/02	11/12/02
	Unit		
Acenaphthene	µg/L	9.4 U	NA
Acenaphthylene	µg/L	9.4 U	NA
Anthracene	µg/L	9.4 U	NA
Benzo(a)Anthracene	µg/L	9.4 U	NA
Benzo(a)Pyrene	µg/L	9.4 U	NA
Benzo(b)Fluoranthene	µg/L	9.4 U	NA
Benzo(ghi)Perylene	µg/L	9.4 U	NA
Benzo(k)Fluoranthene	µg/L	9.4 U	NA
Bis(2-Chloroethoxy)Methane	µg/L	9.4 U	NA
Bis(2-Chloroethyl)Ether	µg/L	9.4 U	NA
Bis(2-Chloroisopropyl)Ether	µg/L	9.4 U	NA
Bis(2-Ethylhexyl)Phthalate	µg/L	19 U	NA
Butyl Benzyl Phthalate	µg/L	9.4 U	NA
Chrysene	µg/L	9.4 U	NA
Di-N-Butyl Phthalate	µg/L	9.4 U	NA
Di-N-Octyl Phthalate	µg/L	9.4 U	NA
Dibenzo(a,h)Anthracene	µg/L	9.4 U	NA
Dibenzofuran	µg/L	9.4 U	NA
Diethyl Phthalate	µg/L	9.4 U	NA
Dimethyl Phthalate	µg/L	9.4 U	NA
Fluoranthene	µg/L	9.4 U	NA
Fluorene	µg/L	9.4 U	NA
Hexachlorobenzene	µg/L	9.4 U	NA
Hexachlorobutadiene	µg/L	9.4 U	NA
Hexachlorocyclopentadiene	µg/L	9.4 U	NA
Hexachloroethane	µg/L	9.4 U	NA
Indeno(1,2,3-Cd)Pyrene	µg/L	9.4 U	NA
N-Nitroso-Di-N-Propylamine	µg/L	9.4 U	NA
N-Nitrosodiphenylamine	µg/L	9.4 U	NA
Naphthalene	µg/L	9.4 U	NA
Nitrobenzene	µg/L	9.4 U	NA
Pentachlorophenol	µg/L	9.4 U	NA
Phenanthrene	µg/L	9.4 U	NA

Table 3-2
Summary of Analytical Results for QC Samples —TAA 31A

Sample Identification		818655-B3111	818655-B3105
Location Code		Equipment Rinsate	Trip Blank
Date Sampled		11/12/02	11/12/02
	Unit		
Phenol	µg/L	9.4 U	NA
Pyrene	µg/L	9.4 U	NA
METALS			
Aluminum	µg/L	500 U	NA
Antimony	µg/L	500 U	NA
Arsenic	µg/L	5 U	NA
Barium	µg/L	100 U	NA
Beryllium	µg/L	10 U	NA
Cadmium	µg/L	5 U	NA
Calcium	µg/L	975 J	NA
Chromium	µg/L	50 U	NA
Cobalt	µg/L	50 U	NA
Copper	µg/L	50 U	NA
Iron	µg/L	32.1 J	NA
Lead	µg/L	5 U	NA
Magnesium	µg/L	928 J	NA
Manganese	µg/L	20 U	NA
Mercury	µg/L	.2 U	NA
Molybdenum	µg/L	100 U	NA
Nickel	µg/L	150 U	NA
Potassium	µg/L	5000 U	NA
Selenium	µg/L	5 U	NA
Silver	µg/L	50 U	NA
Sodium	µg/L	4710	NA
Thallium	µg/L	10 U	NA
Vanadium	µg/L	100 U	NA
Zinc	µg/L	20 U	NA

J - estimated value
MCAS - Marine Corps Air Station
mg/L - milligrams per liter
NA - not analyzed
QC - quality control
U - not detected at or above the stated reporting limit
µg/L - micrograms per liter

Table 4-1
Residential Risk Screening Worksheet for Soil
Former TAA 31A

Detected Chemical	Maximum TAA 31A Soil Concentration (mg/kg)	MCAS El Toro Background Concentration[A] (mg/kg)	CANCER			NON-CANCER		
			Residential PRG[B] (mg/kg)	TAA 31A Maximum Ratio[C]	MCAS El Toro Background Ratio[D]	Residential PRG[E] (mg/kg)	TAA 31A Maximum Ratio[F]	MCAS El Toro Background Ratio[F]
METALS								
Aluminum	26300	14800	NE	NE	NE	7.6E+04	3.46E-01	1.95E-01
barium	147	173	NE	NE	NE	5.4E+03	2.72E-02	3.20E-02
Beryllium	.651	0.669	NE	NE	NE	1.5E+02	4.34E-03	4.46E-03
Chromium	12.5	26.9	2.1E+02	5.95E-02	5.95E-02	NE	NE	NE
Cobalt	6.71	6.98	NE	NE	NE	4.7E+03	1.43E-03	1.49E-03
Copper	8.33	10.5	NE	NE	NE	2.9E+03	2.87E-03	3.62E-03
Manganese	242	8370	NE	NE	NE	1.8E+03	1.34E-01	4.65E+00
Vanadium	38.8	71.8	NE	NE	NE	5.5E+02	7.05E-02	1.31E-01
Zinc	47.7	77.9	NE	NE	NE	2.3E+04	2.07E-03	3.39E-03
Subtotal sum of ratios				5.95E-02	5.95E-02		2.43E-01	5.02E+00
MCAS EL TORO BACKGROUND RISK RATIOS			CANCER RISK		5.95E-08	NON-CANCER HAZARD INDEX		5.02
TAA 31A SUMMED RISK			CANCER RISK	5.95E-08		NON-CANCER HAZARD INDEX	0.24	
TAA 31A RISK LESS BACKGROUND RISK (NET RISK)			NET CANCER RISK	$<1 \times 10^{6}$				

[A] *MCAS El Toro Background upper threshold limit concentrations from Final Technical Memorandum Background and Reference Levels, Bechtel National, Inc. 1996.*

[B] *Residential soil PRG for cancer from the EPA Region 9, November, 2002 list.*

[C] *The Ratio is determined by dividing the Concentration by the respective PRG.*

[D] *Where the background concentration exceeds the maximum concentration the background ratio was defaulted to the maximum ratio.*

[E] *Residential soil PRG for non-cancer from the EPA Region 9, November, 2002 list.*

[F] *The Ratio is determined by dividing the Concentration by the respective PRG. No ratios were calculated for chemicals detected below background levels.*

mg/kg - Milligrams per kilogram.

NE - Not established/No entry.

PRG - Preliminary remediation goal.

Table 4-2
Industrial Risk Screening Worksheet for Soil
Former TAA 31A

Detected Chemical	Maximum TAA 31A Soil Concentration (mg/kg)	MCAS El Toro Background Concentration[A] (mg/kg)	CANCER: Industrial PRG[B] (mg/kg)	CANCER: TAA 31A Maximum Ratio[C]	CANCER: MCAS El Toro Background Ratio[D]	NON-CANCER: Industrial PRG[E] (mg/kg)	NON-CANCER: TAA 31A Maximum Ratio[F]	NON-CANCER: MCAS El Toro Background Ratio[F]
METALS								
Aluminum	26300	14800	NE	NE	NE	7.6E+04	3.46E-01	1.95E-01
Barium	147	173	NE	NE	NE	5.4E+03	2.72E-02	3.20E-02
Beryllium	.651	0.669	NE	NE	NE	1.9E+03	3.43E-04	3.52E-04
Chromium	12.5	26.9	4.5E+02	2.78E-02	2.78E-02	NE	NE	NE
Cobalt	6.71	6.98	NE	NE	NE	4.7E+03	1.43E-03	1.49E-03
Copper	8.33	10.5	NE	NE	NE	2.9E+03	2.87E-03	3.62E-03
Manganese	242	8370	NE	NE	NE	3.2E+04	7.56E-03	2.62E-01
Vanadium	38.8	71.8	NE	NE	NE	1.4E+04	2.77E-03	5.13E-03
Zinc	47.7	77.9	NE	NE	NE	1.0E+05	4.77E-04	7.79E-04
Subtotal sum of ratios				2.78E-02	2.78E-02		4.27E-02	5.00E-01
MCAS EL TORO BACKGROUND RISK RATIOS			CANCER RISK		2.78E-08	NON-CANCER HAZARD INDEX		0.50
TAA 31A SUMMED RISK			CANCER RISK	2.78E-08		NON-CANCER HAZARD INDEX	0.04	
TAA 31A RISK LESS BACKGROUND RISK (NET RISK)			NET CANCER RISK	$<1 \times 10^{6}$				

[A] MCAS El Toro Background upper threshold limit concentrations from Final Technical Memorandum Background and Reference Levels, Bechtel National, Inc. 1996.

[B] Residential soil PRG for cancer from the EPA Region 9, November, 2002 list.

[C] The Ratio is determined by dividing the Concentration by the respective PRG.

[D] Where the background concentration exceeds the maximum concentration the background ratio was defaulted to the maximum ratio.

[E] Residential soil PRG for non-cancer from the EPA Region 9, November, 2002 list.

[F] The Ratio is determined by dividing the Concentration by the respective PRG. No ratios were calculated for chemicals detected below background levels.

mg/kg - Milligrams per kilogram.

NE - Not established/No entry.

PRG - Preliminary remediation goal.

APPENDIX A
2001, TAA 31A CLOSURE REPORT

CLOSURE REPORT
SOILD WASTE MANAGEMENT UNIT 272
TEMPORARY ACCUMULATION AREA 31A
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

Environmental Remedial Action
Contract No. N62474-98-D-2076
Contract Task Order 0024

Document Control Number 3125
Revision 0

December 18, 2001

Submitted to:

U.S. Department of the Navy
Southwest Division
Naval Facilities Engineering Command
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CLOSURE REPORT
SOILD WASTE MANAGEMENT UNIT 272
TEMPORARY ACCUMULATION AREA 31A
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

Environmental Remedial Action
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Document Control Number 3125
Revision 0

December 18, 2001

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Appendix I Copy of Draft Final Phase II RI Report for OU 3A-Site 15
Appendix J Copy of OHM Site Assessment Report for Suspended Fuel Tanks, Stained Areas
Appendix K Excerpts from the Closure Report for TAA 31B

1.0 Introduction

The purpose of this Closure Report is to present information pertaining to Solid Waste Management Unit (SWMU) number 272 (Former Hazardous Waste Storage Area) located north of the western end of the east-west runway at the Marine Corps Air Station (MCAS) El Toro, California.

The Marine Corps Air Station, El Toro, also known as the Station, comprises approximately 4,700 acres and is located in eastern Orange County approximately 45 miles southeast of Los Angeles, California. SWMU 272 is located in the northwestern section of the Station, and SWMU 272 and adjacent features are shown on Figure 1-1.

SWMU 272; also known as Temporary Accumulation Area (TAA) 31A consist of a concrete pad with a 6-ich concrete berm and a sump, was used for storage of waste that were generated from Building 31 a former utilities shop. SWMU 272 is located approximately 40 feet northwest of Building 31. SWMU 272 is located near the boundaries of the former Installation Restoration Program (IRP) Site 15 as shown in Figure 1-2. SWMU 272 and the areas immediately northeast and south of SWMU 272 were previously investigated in separate studies.

The SWMU 272 (TAA 31A) was inspected and sampled during the Resource Conservation and Recovery Act Facility Assessment (RFA) and reported in the *Final RCRA Facility Assessment Report, Marine Corps Air Station El Toro, California (Jacobs Engineering Group Inc., [JEG] 1993)*. Soil samples were collected from one angle boring during the RFA field sampling visit. Surface drainage area southwest of SWMU 272 was also investigated under the RFA as SWMU 273. Soil samples were collected from the three borings at SWMU 273 (now designated as a phantom or non-existent washrack). The RFA documentation (JEG 1993) recommended "*no further action*" (NFA) based on the field sampling activities for both SWMU 272 and SWMU 273.

In November 1995, Bechtel National Inc., (BNI) performed a visual inspection of TAA 31A as part of RFA. During field visit, BNI observed that TAA 31A concrete pad surface and sump was clean. Therefore no soil sampling was performed by BNI (BNI 1996).

The area northwest of TAA 31A was investigated as IRP Site 15, Unit 1 (Suspended Fuel Tanks, Stained Areas) which was transferred to the Petroleum Corrective Action Program through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) petroleum exclusion. Petroleum-impacted surface soils were removed from the former IRP Site

15 Unit 1 and *no further action* status was designated by the Regional Water Quality Control Board (RWQCB) Santa Ana Region in May 1997.

The area adjacent to and southwest of TAA 31A has been investigated under the IRP Site 15 Unit 2 (Suspended Fuel Tanks, SWMU 273 and Drainage Ditch) and Unit 2 achieved no further action status in September 1997 when the Record of Decision, Operable Units 2A and 3A, *No Action Sites* was signed.

Additionally, OHM also inspected and sampled the TAA 31B located approximately 100 feet northwest of the north end of Building 31 in November 1999 and submitted a Closure Report in March 2001 requesting "no further action" for TAA 31B (OHM 2001).

Former IRP Site 15 was sampled as part of the Phase I Remedial Investigation in 1993. Results of the RFA and Phase I Remedial Investigation for IRP Site 15 are summarized in the *Final Work Plan, Phase II Remedial Investigation/Feasibility Study, Appendix O: DQOs, Site 15, Suspended Fuel Tanks, Marine Corps Air Station El Toro, California*, (BNI, 1995). The results of the Phase I and Phase II sampling activities at IRP 15 are published in the *Draft Final Phase II Remedial Investigation Report, Operable Unit 3A – Site 15, Suspended Fuel Tanks* (BNI, 1997). A site assessment of Unit 1 was completed and results are presented in the *Site Assessment Report, Suspended Fuel Tanks Site, Stained Areas (former Installation Restoration Program Site 15, Unit 1), Marine Corps Air Station, El Toro, California*, (OHM, 1997). As part of the site verification activities, a 20 feet by 60 feet area was excavated down to 18 inches. Copies of these reports and excerpts pertaining to previously conducted investigations around TAA 31A are presented in various appendices within this report.

The Station closed on 2 July 1999 in accordance with the Base Realignment and Closure Act of 1993 (BRAC III). TAA 31A is located within a parcel designated for future use as terminal and parking usage in the *Preferred Land Use Plan*, (County of Orange, March, 2001) and a copy of this plan is included in the Appendix A.

Historical aerial photographs, Station maps and plans, and the results of previous environmental restoration program investigations were evaluated. A visual inspection of the vicinity of SWMU 272 (TAA 31A) was made during December of 1994, November 1995 and in November of 1999; the concrete slab in all cases is reported to be in good condition, and no significant stains or cracks were observed. The records show that Building 31 and its associated TAA's (31A and 31B) were operated by the Marine Wing Support Squadron Utilities (MWSS Utilities) and was managed according to the procedures and management practices identified in the Hazardous Material/Hazardous Waste Management Plan (SAIC, 1994), and the Storm Water Pollution

Prevention Plan (IEM, 1997). Used oil, chlorine, and rags with fuel, solvent, and oil were potentially stored at SWMU 272 (TAA 31A).

Based upon the excellent condition of the concrete pad surface at the storage area, the field data collected during the RFA, RI, and Site Assessment at former IRP Site 15, Units 1 and 2 and at TAA 31B, the information presented in the RFA and SWPPP, the results of the visual inspection, the absence of evidence of a release to the ground surface, and the results of human health risk assessment/screening at Unit 2 and TAA 31B, we are requesting that "no further action" status be designated for SWMU 272 (TAA 31A) in the BRAC Cleanup Plan update.

2.0 Field Inspections and Historical Records

2.1 Field Inspections

The former storage area, SWMU 272 (TAA 31A) was visually inspected by JEG in December 1994, BNI in November 1995, and by OHM in November of 1999. During all field inspection site visit at TAA 31A, concrete slab and sump were in excellent condition with no appreciable stains. BNI stated that there was "no potential for release evident based upon this surveillance".

SWMU 272 (TAA 31A) is a former HWSA located approximately 40 feet northwest of Building 31. SWMU 272 consist of one 10 feet x 20 feet vacant concrete pad with aluminum roof. Concrete pad has a concrete curb or berm around the perimeter, and the curb is approximately 6 inches high. Also one concrete blind sump located in the northwest side. The area immediately adjacent to the concrete pads is unpaved and covered with grasses and weeds. The fence surrounding the Building 31 was secured at the time of inspection.

No stains or discolored areas were observed on the surface of the concrete pad, sump or on the concrete berms, and no significant cracks were observed on the pad, sump or the berms. The concrete surfaces and sump were clean and appeared to be in excellent condition. No stains or discolored areas were observed on the unpaved surfaces adjacent to the concrete pad. A copy of the field inspection check list log with photographs is included in Appendix B.

Surface runoff from the SWMU 272 (TAA 31A) vicinity is conveyed through the surface drainage area southwest of SWMU 272. This surface drainage area was also investigated under the RFA as SWMU 273. Soil samples were collected from the three borings at SWMU 273 (now designated as a phantom or non-existent washrack). Surface runoff through the drainage that eventually discharge to Bee Canyon Wash. Surface water quality is monitored under the Station's National Pollutant Discharge Elimination System (NPDES) Permit for storm water, which was issued by the Regional Water Quality Control Board, Santa Ana Region. Additionally, the surface drainage channels were investigated as IRP Site 25 – the Major Drainages – and a Record of Decision for No Action was signed for IRP Site 25 in September 1997.

2.2 Historical Property Records and Environmental Program Management Plan Records

Property records including the Station's plant account data base were acquired and reviewed, and information pertaining to structures located near SWMU 272 (TAA 31A) is summarized in Table 2-1:

Table 2-1 – MCAS El Toro Property Records, Vicinity of SWMU 272 (TAA 31A)

Building Identification Number	Approximate year of Acquisition or Construction, Square Footage	Type of Use	Comments
SWMU 272 Vicinity			
Building 31	1943, 6240 s.f.	Auto Maintenance Facility	Operated by Marine Wing Support Squadron Utilities
Building 29	1943, 6,240 s.f.	Storage	

The Station's environmental compliance program management plans were acquired and reviewed in order to identify any other locations in the immediate vicinity of SWMU 272 (TAA 31A) that may have been designated for storage of hazardous substances. The Hazardous Material/Hazardous Waste Management Plan (HM/HWMP) (SAIC, 1994) identifies only on storage facility near Building 31, and that being TAA 31B. Information from the plan is presented in the Appendix C.

OHM inspected the concrete slab of TAA 31B in early November 1999 and removed surface debris. The concrete slab was on sound condition with out any stains or cracks.

OHM also collected soil samples from 6 borings around the perimeter of the TAA 31B and documented the results of the sampling, analysis, and risk calculations associated with the closure of TAA 31B in a *Closure Report* dated March 23, 2001 (OHM 2001). The residential and industrial risk calculations for the TAA 31B resulted in net cancer risk less background risk of less than 10^{-6} (OHM 2001).

The Storm Water Pollution Prevention Plan (SWPPP) was reviewed and excerpts from the SWPPP for the vicinity of SWMU 272 (TAA 31A) are presented in the Appendix D of this report. The SWPPP indicates that the storage area was well kept, that training of personnel in spill management was provided, and that best management practices were implemented.

2.3 Previously Completed Investigations in the Vicinity of SWMU 272

Table 2-2 includes an overview of the types of data that have been collected within or near SWMU 272 (TAA 31A).

Table 2-2. Field Sampling Activities Conducted at or near SWMU 272(TAA 31A)

Site Identification Number	Types of Sampling Activities	No further action (NFA) or other decision document(s)	Comments
SWMU 272 (TAA 31A)	One angle boring to 60 feet. Six soil samples were collected and analyzed for TPH, VOCs, SVOCs, Pesticide/PCBs, and metals.	Recommended NFA in RFA based on soil sample analytical results	
Former IRP Site 15, Unit 1	Phase I RI Sampling from 4 locations found elevated TPH concentrations in two stained areas; Site 15, Unit 1 was taken off of the IRP list due to the Petroleum Exclusion; A Site Assessment was done in which 10 locations were sampled delineating the TPH impacted soil. A 20 ft X 60 ft. X 18 inch area was excavated; confirmation samples taken resulted in nondetects of TPH and BTEX. Analytical results are below the CA LUFT guidelines target levels. Groundwater analyses from a monitoring well located in the site resulted in low to nondetect concentrations of benzene and TCE in the shallow aquifer. The detection of TCE is fairly regional in nature therefore these detections do not necessarily indicate a local source.	Closed under the Petroleum Corrective Action Program, May, 1997	
IRP Site 15, Unit 2 (SWMU 273)	Phase II RI Sampling from depths of 0, 3-5, and 8-10 feet. Analyses included PAHs, TPH, Pesticides/PCBs, TAL metals, and Cr VI. Risk analysis resulted in acceptable risk levels for residents and industrial workers for cancer and noncancer endpoints. Impacted soil does not extend below 10 feet.	NFA received, September 1997	
TAA 31B	Soil sampling, six soil borings along each side of the concrete pad resulted in acceptable health risk levels for both cancer and noncancer endpoints.	NFA from the DTSC pending.	No significant detections from soil at TAA; Located near SWMU 272.

2.4 BRAC Cleanup Plan (BCP) Information

The BRAC Cleanup Plan (BCP) update of 2001, Tables 2 and 3, indicate that further action is required for SWMU 272 (TAA 31A) and that the Environmental Condition of Property (ECP) is identifier number 6 – "Areas of known contamination where required response actions have not been implemented". This implies that further action is required in the compliance program which is inconsistent with the recommendations of the RFA Report and the documentation of the Final Environmental Baseline Survey Report which recommend no further action; excerpts from these reports are presented in the Appendix E.

It is recommended that Tables 2 and 3 of the BCP be revised to state that SWMU 272 *was managed in accordance with the best management practices and procedures, is located within the investigation boundaries of former IRP Site 15, and that no further action (NFA) is required under the compliance program*. Additionally, it is recommended that the ECP identifier 3 ("Areas of contamination below action levels") be designated.

2.5 Soil and Ground Water Conditions

Soil samples were collected from several locations at or near SWMU 272 (TAA 31A) during the RFA investigation and the investigations of the former IRP Site 15 Units 1(Phase 1 RI and Site Assessment) and Unit 2 (RFA and Phase II RI), and as part of the TAA 31B investigation.

2.5.1 Soil Data

RFA Soil Data.

During the RFA Visual Site Inspection (VSI) and subsequent Sampling visit, soil samples were collected from SWMU 272 (TAA 31A) and at SWMU 273 (IRP Site 15 Unit 2), as shown on the Site Plan (Figure 2-1). Three locations were sampled at IRP Site 15, Unit 2 from depths of 2 and 5 feet. One location (angle boring) at SWMU 272 was sampled at 10-foot intervals down to 60 feet. The sample analyses resulted in very low concentrations of TPH, concentrations of metals below PRGs, nondetected levels of SVOCs and Pesticides/PCBs, and very low levels of some VOCs which are considered common laboratory contaminants (methylene chloride, acetone, and 2-butanone). No chemicals of concerns were detected above the PRGs for soil. The RFA recommended NFA for both SWMUs 272 and 273 respectively (JEG 1993). Copies of the VSI form, figure, analytical results table from the JEG RFA report are included in Appendix F, JEG RFA Background Information.

In November 1995, BNI visited SWMU 272 (TAA 31A) and observed that TAA 31A concrete pad surface and sump were clean. Also there were no potential for release evident based on field surveillance and recommended no sampling for TAA 31A. Copies of TAA 31A VSI evaluation forms from the BNI Final RFA Addendum report are included in Appendix G, BNI VSI Evaluation Report.

Phase I RI Soil Data:

During the Phase I RI sampling event, soil samples were taken in the stained areas associated with the former IRP Site 15, Unit 1 (JEG, 1993) from 4 locations. Sample analysis resulted in TPH concentrations ranging from nondetect to 8530 mg/kg TPH as diesel and nondetect to 23,034 mg/kg TRPH with the highest concentrations in near-surface soil. In 1995, the IRP Site 15, Unit 1 was transferred to the "Petroleum Corrective Action Program" through the CERCLA Petroleum Exclusion (Appendix H) because the source of the contaminants was the former elevated fuel-storage tanks.

Phase II RI Soil Data:

The Phase II RI sampling occurred in 1996 at the Site 15, Unit 2 area (formerly SWMU 273) in accordance with the final Work Plan (BNI, 1995a) and the final Field Sampling Plan Phase II RI/FS (Bechtel, 1995b). Samples were taken from 11 locations at three depths including surface, 3-5 feet, and 8-10 feet depths. Selected samples were analyzed for PAHs (EPA 8310), TPH (EPA 8015-M), Pesticides/PCBs (EPA CLP/608-M), TAL metals (EPA CLP), and Cr VI (EPA 7196).

The cancer risks for the future residents and industrial workers at Unit 2 are within the acceptable risk range of 10^{-4} and 10^{-6} as stated in the National Oil and hazardous Substances Pollution Contingency Plan (NCP). The primary risk driver for the cancer endpoint is arsenic, which is approximately 4 times higher than the background for the Station. The cumulative HI for future industrial workers at Site 15, Unit 2 is less than 1. For future residents, the HI is greater than 1.0 due primarily to manganese. However, the manganese HI at Unit 2 is only 1.3 times the HI for background manganese, indicating the concentration of manganese at Site 15 Unit 2 is not significantly different from background. Therefore, noncancer hazards at this unit are not considered significant.

The RI concluded: "TAL metals above their respective background concentrations and PAHs (the risk drivers) in shallow soil at Site 15 do not appear to pose an unacceptable risk to potential on-site resident (or on-site industrial worker) based upon the reported range of concentrations in shallow soil and the calculated risk values" (Bechtel, 1997). A copy of the Draft Final Phase II RI Report for OU-3A Site 15 is included in Appendix I.

Site Assessment Soil Data:
Field verification sampling was conducted in January 1996 by OHM to verify the presence of petroleum hydrocarbon contamination at former IRP Site 15, Unit 1 (OHM, 1996). Samples were taken from eight borings at depths of 0.5 feet depth. Samples were analyzed for TPH as diesel (CA-LUFT 8015-M method) and BTEX (EPA 8020 method) (Figure 2-1). Sample results showed concentrations of TPH as diesel ranging from nondetect to 6,800 parts per million (ppm). BTEX results were all nondetect.

Based on the review of verification soil data, in February of 1996, OHM excavated the top 18 inches of soil within an affected area of approximately 20 feet by 60 feet. The excavated soil was transported offsite to a landfill for disposal. Two soil samples were taken in the excavated area, and 3 samples were taken in an adjacent to the southeast to verify that affected soil had been effectively removed. Results of the verification samples were from nondetect to 350 ppm TPH as diesel and all nondetect for BTEX. OHM submitted Site Assessment Report documenting the field sampling and soil removal activities in April 1997 (OHM 1997). RWQCB granted NFA for the former IRP Site 15, Unit 1 (Suspended Fuel Tanks Site, Stained Areas) in May 1997. A copy of the OHM Site Assessment Report for former IRP Site 15, Unit 1 is included in Appendix J.

TAA 31B Soil Data:
TAA 31B is located to the north of SWMU 272 as shown on Figure 2. TAA 31B was investigated in accordance with the Department of Toxic Substance Control (DTSC)-approved *Draft Supplemental Work Plan, Closure of Various Temporary Accumulation Areas and RCRA Facility Assessment Sites, Marine Corps Air Station El Toro, California* (OHM, 1997a). Samples were retained from 6 boring locations around the perimeter of the concrete pad. The pad itself was bermed and shown to be in great condition with no cracks or stains observed (October 1999). Samples were analyzed for TPH as gasoline, TPH as diesel, and TPH as JP-5 using CA LUFT 8015M. The samples were also analyzed for pesticides/PCBs using EPA 8081, VOCs using EPA 8260, SVOCs using EPA 8270B, metals using EPA 6010A, mercury using EPA 7470A/7471A, cyanide using EPA 9010, and pH using EPA 150.1.

A screening risk assessment was performed on the soil analytical data from TAA 31B following EPA Region 9 PRGs Memorandum dated November 1, 2000 (EPA, 2000). The site-related cancer risk and non-cancer hazard index at TAA 31B were found to be acceptable because the carcinogenic risk was less than 10^{-6} for the residential scenario and the industrial scenario. The non-cancer hazard index for detected chemicals was less than 1.0 for the current industrial scenario. The non-cancer HI for the potential future residential land use scenario is less than 1.0

for all target organs except soft tissue for which the only contributor was iron. The average concentration of iron was less than background and the PRG. A copy of the Residential and Industrial Risk Assessment Table from TAA 31B report is included in Appendix K.

2.5.2 *Ground Water Data*

Ground water conditions have been investigated in the vicinity of SWMU 272 during the investigation IRP Site 15. Well 15_DGMW51 is located approximately 75 feet north of SWMU 272. This well is screened at 125-165 feet below ground surface in the "Shallow" groundwater unit. Groundwater is located at a depth of approximately 115 feet (CDM, 1998). The well has been sampled quarterly since 1996 and analyzed for VOCs. Results indicate that nondetect to low levels of benzene and trichloroethane have been detected from 15_DGMW51.

3.0 Findings and Recommendations

The following findings are based upon information collected during the record search activities, review of available background documents, and the observations during the visual inspection of the vicinity of SWMU 272 (TAA 31A).

- SWMU 272 (TAA 31A) was identified as a hazardous waste storage area during the Resource Conservation and Recovery Act Facility Assessment (RFA). A one-angle boring was drilled and six soil sampled were collected at SWMU 272 during the RFA field-sampling visit by JEG. TPH, VOCs (except for acetone and methylene chloride; common lab contaminant) SVOCs and Pesticide/PCB compounds were not detected above laboratory reporting limits in all six samples. No metal compounds were detected above EPA region 9 Residential PRG October 1999. Based upon soil sample results and the field inspection and records review, the RFA recommendation was no further action for SWMU 272 (TAA 31A).
- BNI visited TAA 31A in November 1995 and observed clean concrete pad surface and sump. Also there were no potential for release evident based on field surveillance and recommended no sampling for TAA 31A.
- SWMU 272 (TAA 31A) was used for storage of wastes generated at the nearby Building 31 and the adjacent storage yard and potential wastes included used oil, chlorine, and rags with fuel and oil.
- OHM visually inspected SWMU 272 (TAA 31A) in November of 1999 and no evidence of spills or releases of hazardous substances were observed. The surfaces of the concrete pads and berms were in excellent condition, without visible cracks, and without stains. No stains or discolored areas were observed on the unpaved surfaces adjacent to TAA 31A.
- The RI of IRP Site 15 Unit 2 located adjacently to the south of SWMU 272 (TAA 31A), reported in March of 1997 that the future residential and industrial worker cancer and noncancer risks associated with Unit 2 (formerly SWMU 273) are in the range that is considered acceptable. IRP Site 15 Unit 2 achieved NFA status in September 1997 when the Record of Decision, Operable Units 2A and 3A, "*No Action Sites*" was signed.
- OHM investigated and removed sub-surface petroleum contaminated soil from IRP Site 15 Unit 1 (located northwest of TAA 31A), which was transferred to the petroleum corrective action program through CERCLA petroleum exclusion. The RWQCB Santa Ana Region designated NFA for Unit 1 in May 1997.
- The TAA 31B located approximately 140 feet to the north of SWMU 272, in the same yard, built similarly and of similar condition was sampled by OHM in November 1999. The site-related cancer risk and non-cancer hazard index at

TAA 31B were found to be acceptable because the carcinogenic risk was less than 10^{-6} for the residential scenario and the industrial scenario.

- The status and/or comments associated with SWMU 272 (TAA 31A) in the BCP update should be revised as follows: "SWMU 272 (TAA 31A) was managed in accordance with the best management practices and procedures, is located in what was formerly IRP Site 15, and that no further action (NFA) is required under the compliance program".

Based upon the excellent condition of the concrete pad, the results of soil sample analysis from RFA, RI and adjacent investigations, the absence of visual evidence of releases from the former temporary storage area, and the continued management of the SWMU 272 (TAA 31A) and the adjacent area, it is recommended that *no further action status* be designated for SWMU 272 (TAA 31A) and that *no further action status* with ECP identifier number 3 be documented in the next BCP Update.

4.0 References and/or Sources of Information

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FIGURES

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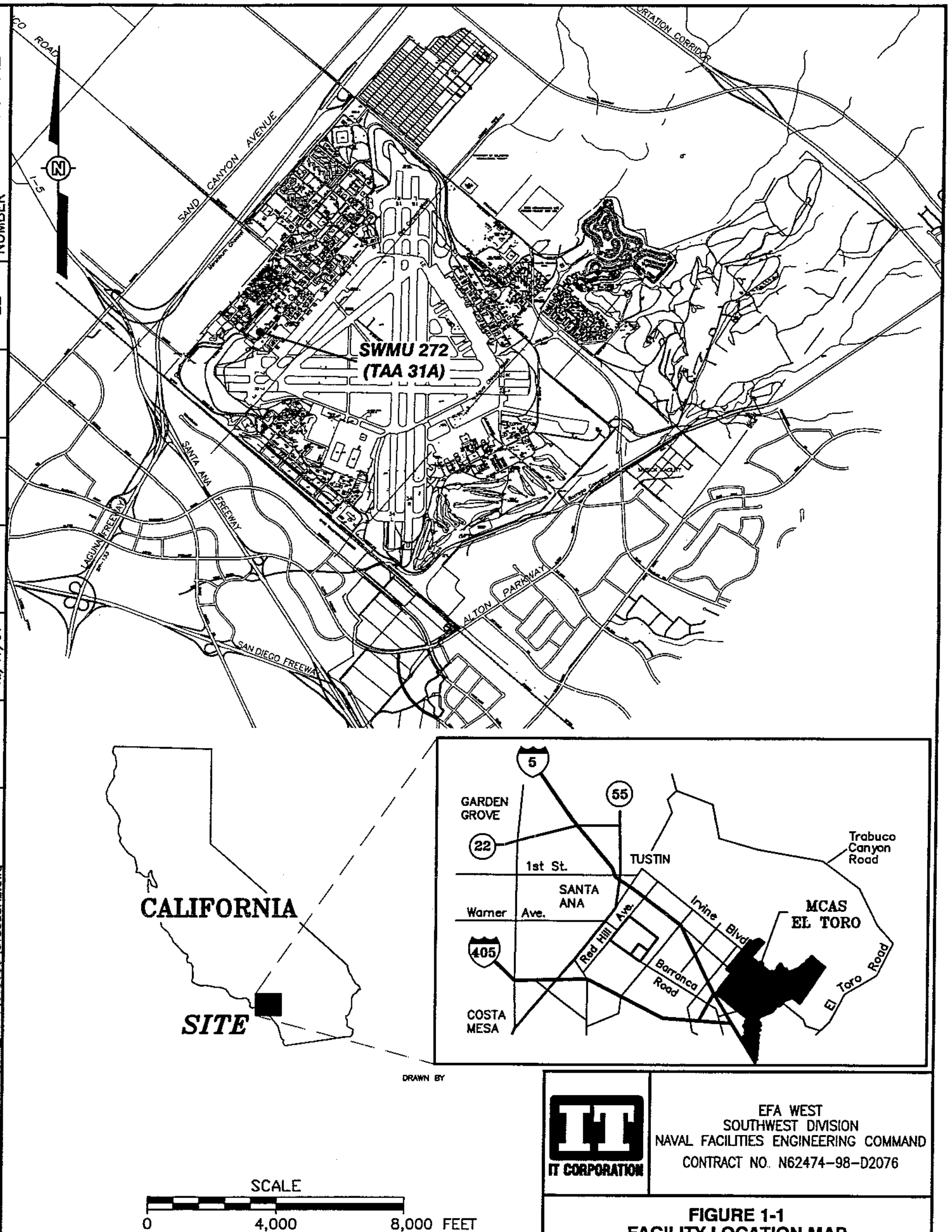

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NAVAL FACILITIES ENGINEERING COMMAND
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FIGURE 1-1
FACILITY LOCATION MAP
SWMU 272 (TAA 31A)

MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

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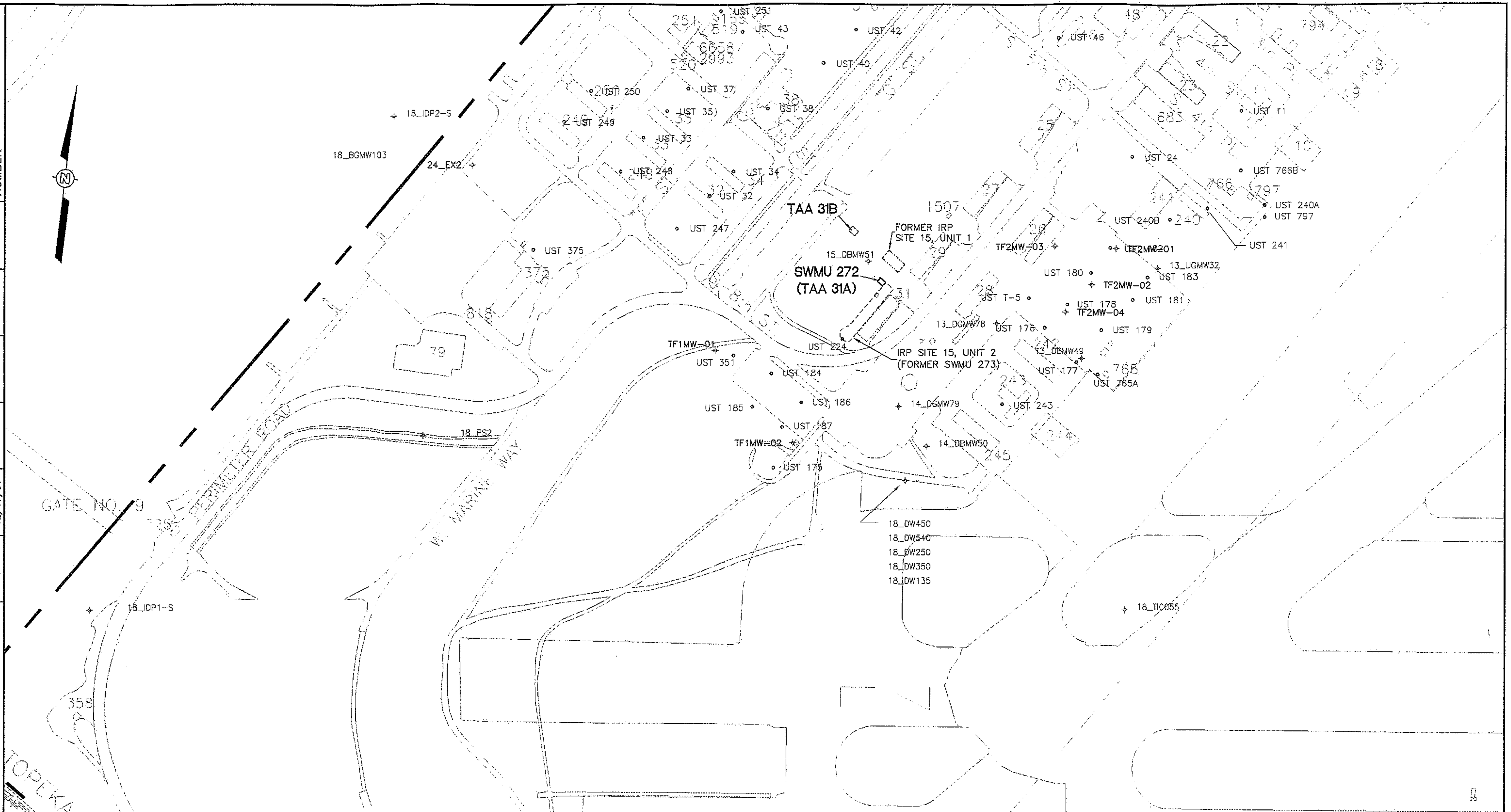


EXPLANATION:

+ GROUNDWATER MONITORING WELL

SCALE

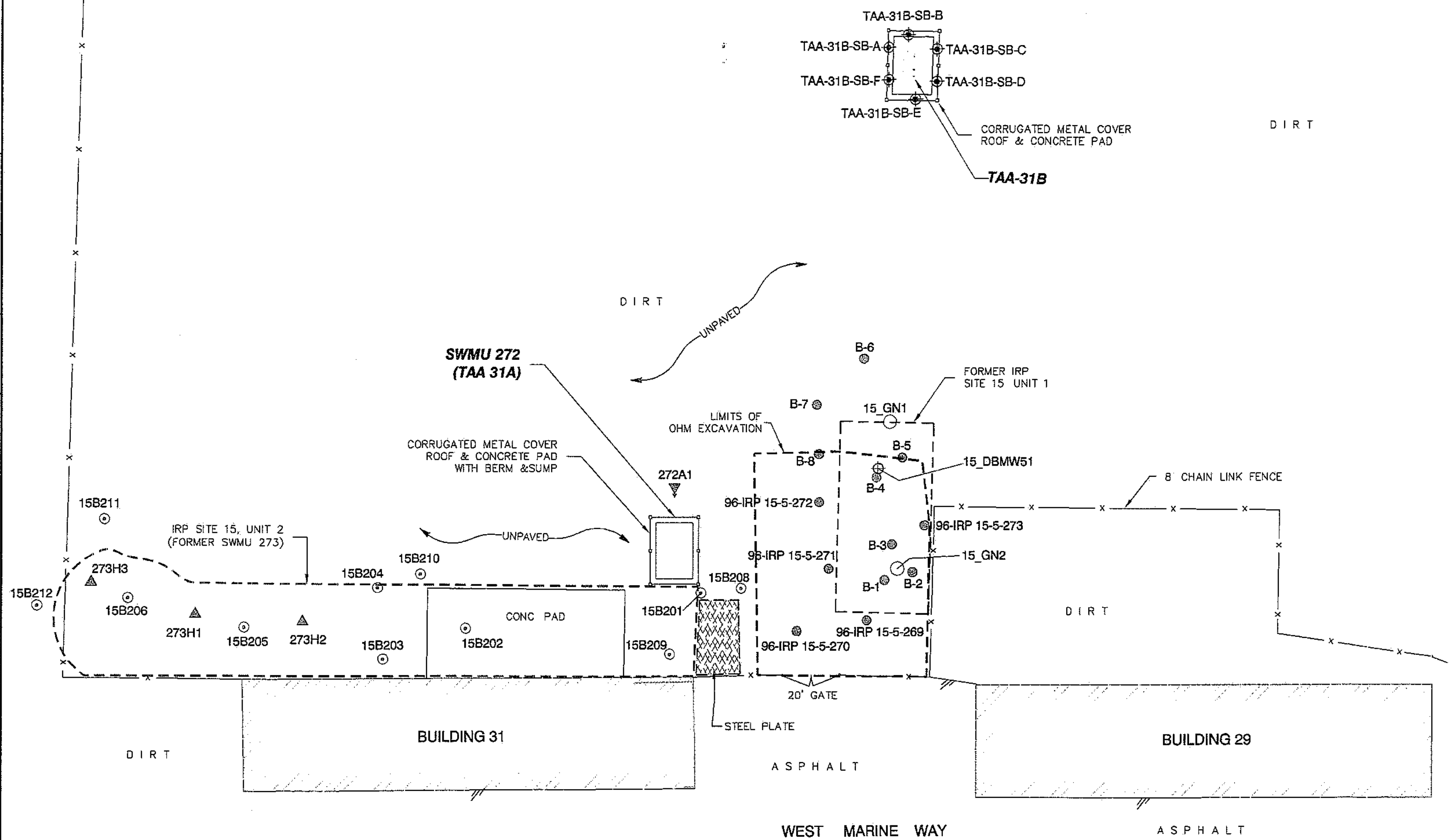
0 300 600 FEET

IT CORPORATION

EFA WEST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CONTRACT NO N62474-98-D2076

FIGURE 1-2
LOCATION MAP
SWMU 272 (TAA 31A)

MARINE CORPS AIR STATION
EL TORO, CALIFORNIA



LEGEND:

- TAA INVESTIGATION SOIL BORINGS (OHM, 2001)
- RFA ANGLE BORING (JEG 1993)
- RFA BORING (JEG 1993)
- PHASE II – RI SURFACE AND NEAR SURFACE SOIL SAMPLE (BECHTEL 1997)
- PHASE I – RI MONITORING WELL (JEG, 1993)
- PHASE I – RI SOIL SAMPLE (JEG 1993)
- FORMER IRP SITE 15, UNIT 1 SITE ASSESSMENT SAMPLE (OHM 1997)
- CHAIN LINK FENCE
- LIMITS OF SOIL EXCAVATION (OHM. 1997)

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NAVAL FACILITIES ENGINEERING COMMAND
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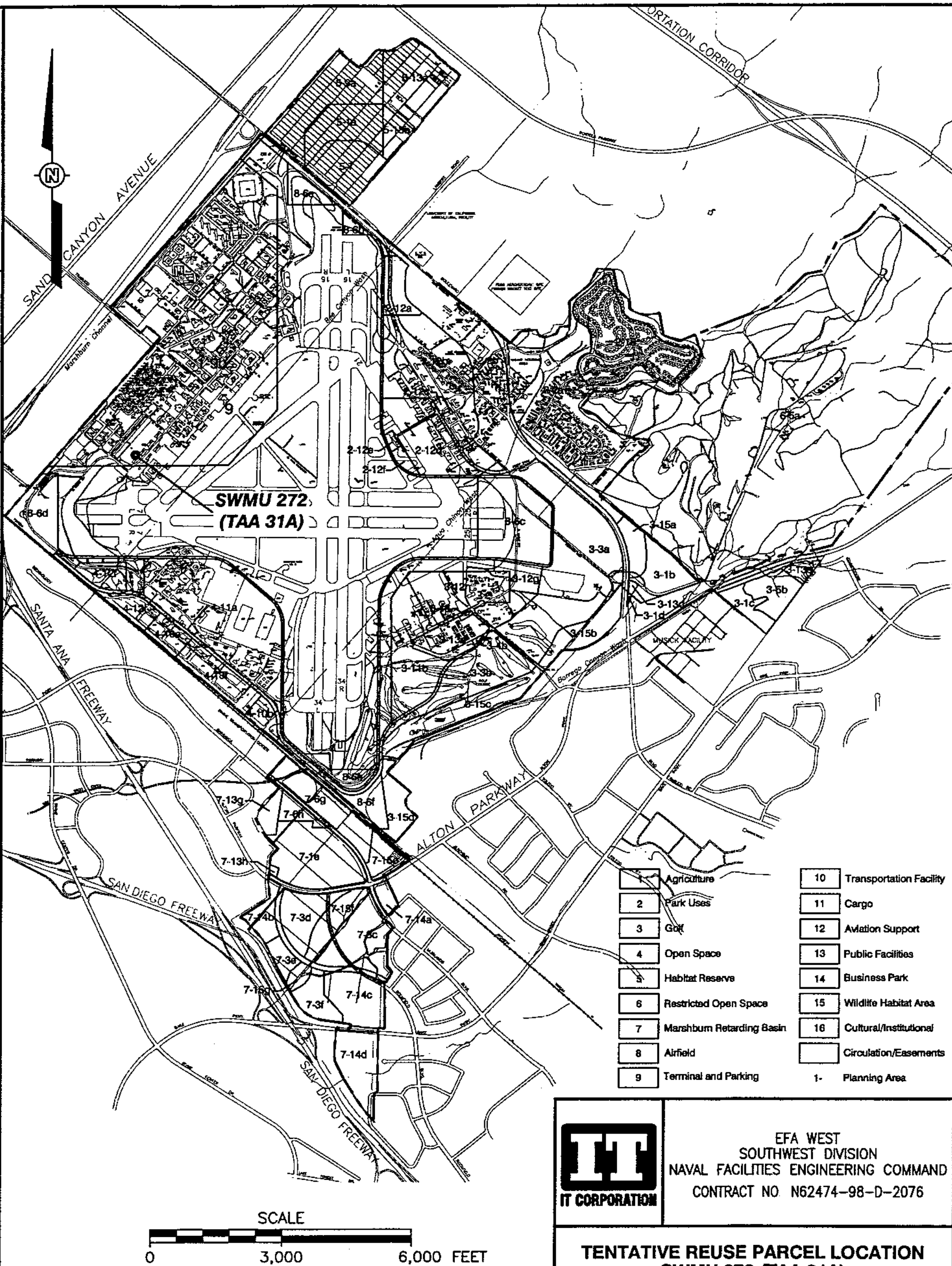
FIGURE 2-1
SITE PLAN
SWMU 272 (TAA 31A)

MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

APPENDIX A
COUNTY OF ORANGE PREFERRED LAND USE PLAN



IT CORPORATION

EFA WEST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CONTRACT NO. N62474-98-D-2076

TENTATIVE REUSE PARCEL LOCATION
SWMU 272 (TAA 31A)

MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

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RP 12/17/01	--	--	818655-A3

Dec 17, 2001 - 16:49:52 I:\IT CORP\EFA West\818655\818655A3.dwg

APPENDIX B
FIELD INSPECTION CHECK LIST

CHECK LIST

Resource Conservation and Recovery Act (RCRA) Facility Assessment Program
Marine Corps Air Station, El Toro

Description: (from source document(s) Final RFA Report, El Toro MCAS (JEG 1993) and Final Addendum RFA Report, MCAS El Toro, (BNI 1996):
RFA SWMU 272: Hazardous Waste Storage Area

Location: Northwest of Building 31, approximately 40 feet

<u>JEG SWMU 272 VSI Record</u>: *The former hazardous waste storage area consists of a concrete pad with a 6-inch concrete berm, sump and a roof. There was no staining observed on the surface of the concrete pad or surrounding ground surface. Although there were no evidence of a release at this HWSA, a sampling visit was recommended for SWMU 272. As part of the sampling visit, one 60 feet angle boring was drilled and 6 soil samples were collected. Based on the review of soil sample data, JEG recommend NFA for SWMU 272 (TAA 31A).*
<u>BNI TAA 31A VSI Record</u>: *Concrete pad, surface and sump are clean, no further sampling recommended.*

Visual Inspection Date (s): *November 1999*

Participant(s) (with affiliation (s)) in inspection(s): *Dhananjay Rawal*
IT Corporation, Project Manager

Current Site Conditions: *SWMU 272 (TAA 31A) and IRP Site 15 were vacant at the time of the inspection. Additionally, the adjacent Building 31 was vacant. SWMU 272 (TAA 31A) is located within an enclosed (fenced) area surrounding Building 31 and adjacent to the north side of Building 31, includes a concrete pad with 6-inch berm, a sump and roof. The area immediately adjacent to the concrete pad is unpaved and covered with grasses and weeds.*

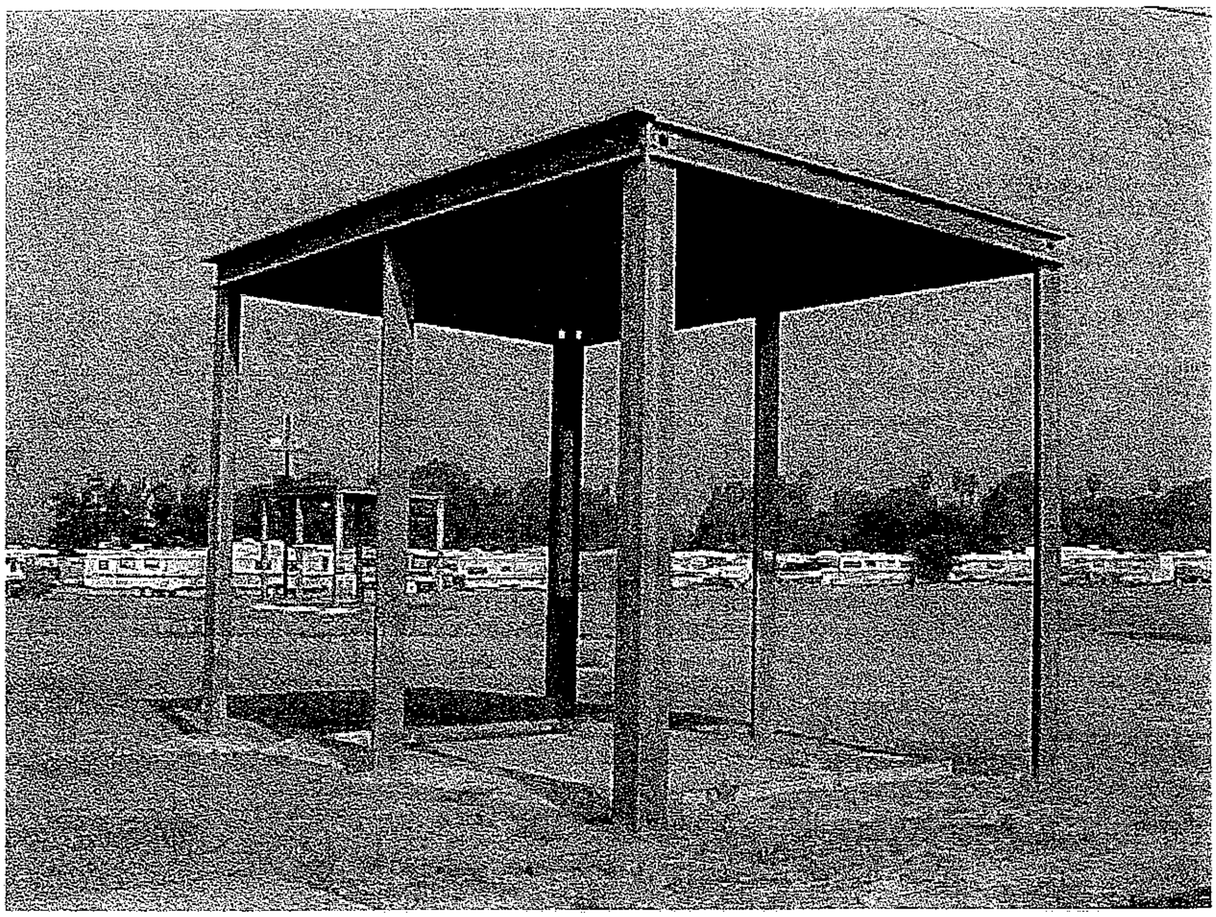
No stains or discolored areas were observed on the concrete pad, berm or sump. No significant cracks were observed on the pad surface. The concrete surface was clean and appeared to be an excellent condition. No stains or discolored soil areas were observed on the unpaved surfaces adjacent to the concrete pad. SWMU 272 (TAA 31A) is surrounded by IRP Site 15 Unit 1 and 2, which were investigated, sampled and then achieved NFA.

Is there visual evidence of storage activities present at this site? *No*

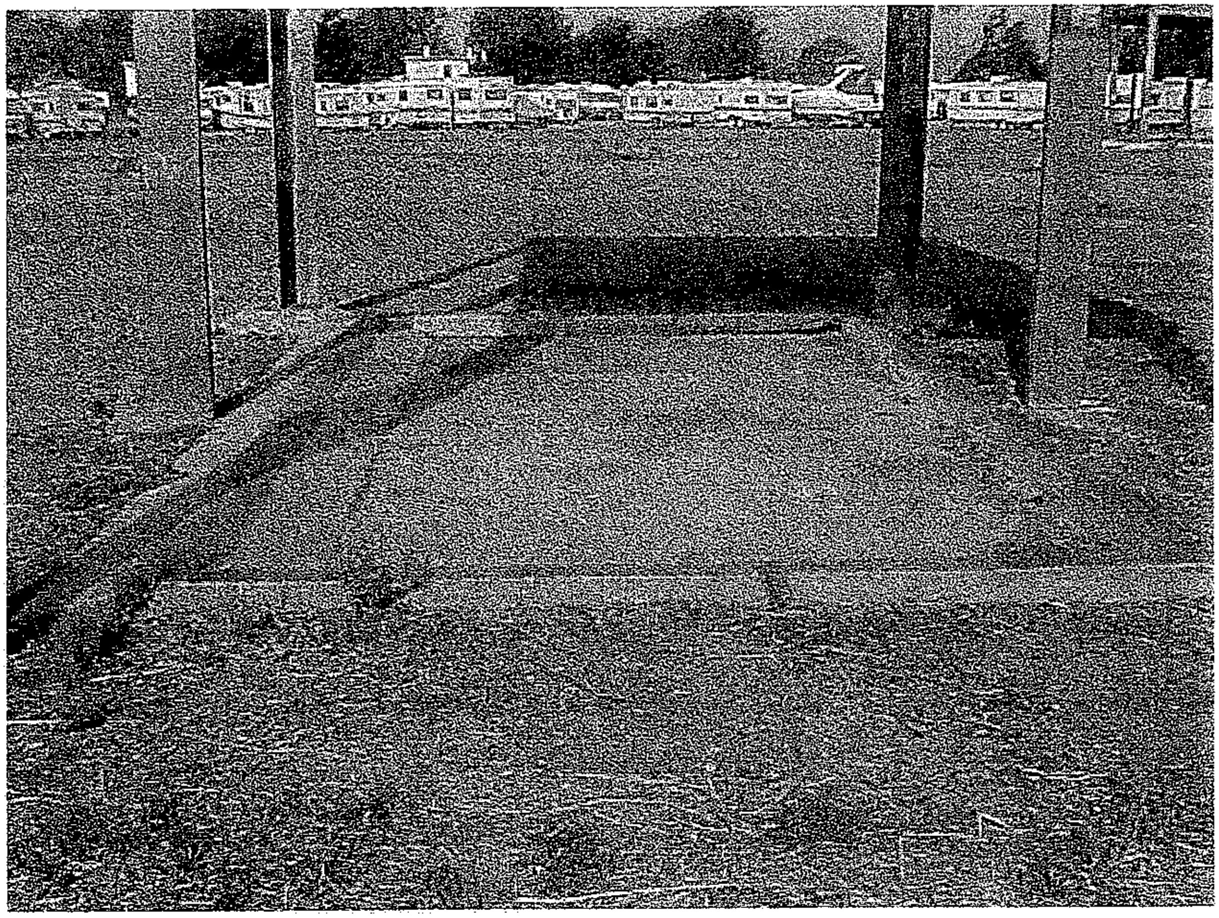
Are their indications of potential or current releases? *No. No hazardous substances or waste were observed during the inspection and no stains were observed on or around the concrete pad.*

Description of photograph(s): *Photograph of SWMU 272 (TAA 31A) shows clean concrete pad surface and surrounding unpaved soil.*

Date of preparation of checklist: *November 1999*



Photograph No. 1
SWMU 272 (TAA 31A), shown are the concrete pad with berm and sump, the roof structure, and the surrounding unpaved area No waste was stored at TAA 31A at the time of the inspection. Please note that TAA 31B is the similar structure shown in the background



Photograph No. 2
SWMU 272 (TAA 31A), showing the excellent condition of the concrete pad surface.
No cracks or stains were observed on the pad and in the sump.

APPENDIX C
EXCERPTS FROM THE MCAS EL TORO HAZARDOUS MATERIALS/HAZARDOUS WASTE MANAGEMENT PLAN, AUGUST 1994

Final

Marine Corps Air Station El Toro Hazardous Material/Hazardous Waste Management Plan

EXTRACTS

August 1994

Annotations made by the writer of the Summary Report are identified with a star symbol or an arrow

Prepared for:

Southwest Division Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, CA 92132-5190

Prepared by:

Science Applications International Corporation
Engineering Sciences Division
10260 Campus Point Drive
San Diego, CA 92121

Contract No. N68711-92-D-4658
Delivery Order No. 0004

Final

Marine Corps Air Station El Toro Hazardous Material/Hazardous Waste Management Plan

August 1994

Prepared for:

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San Diego, CA 92121

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Delivery Order No. 0004

▲ HAZARDOUS MATERIALS STORAGE

● HAZARDOUS WASTE ACCUMULATION POINT

■ ONE YEAR PERMITTED HAZARDOUS WASTE STORAGE AREA

EXTRACTS

MCAS El Toro
Santa Ana, California

HAZARDOUS WASTE ACCUMULATION POINTS AND HAZARDOUS MATERIAL STORAGE LOCATIONS

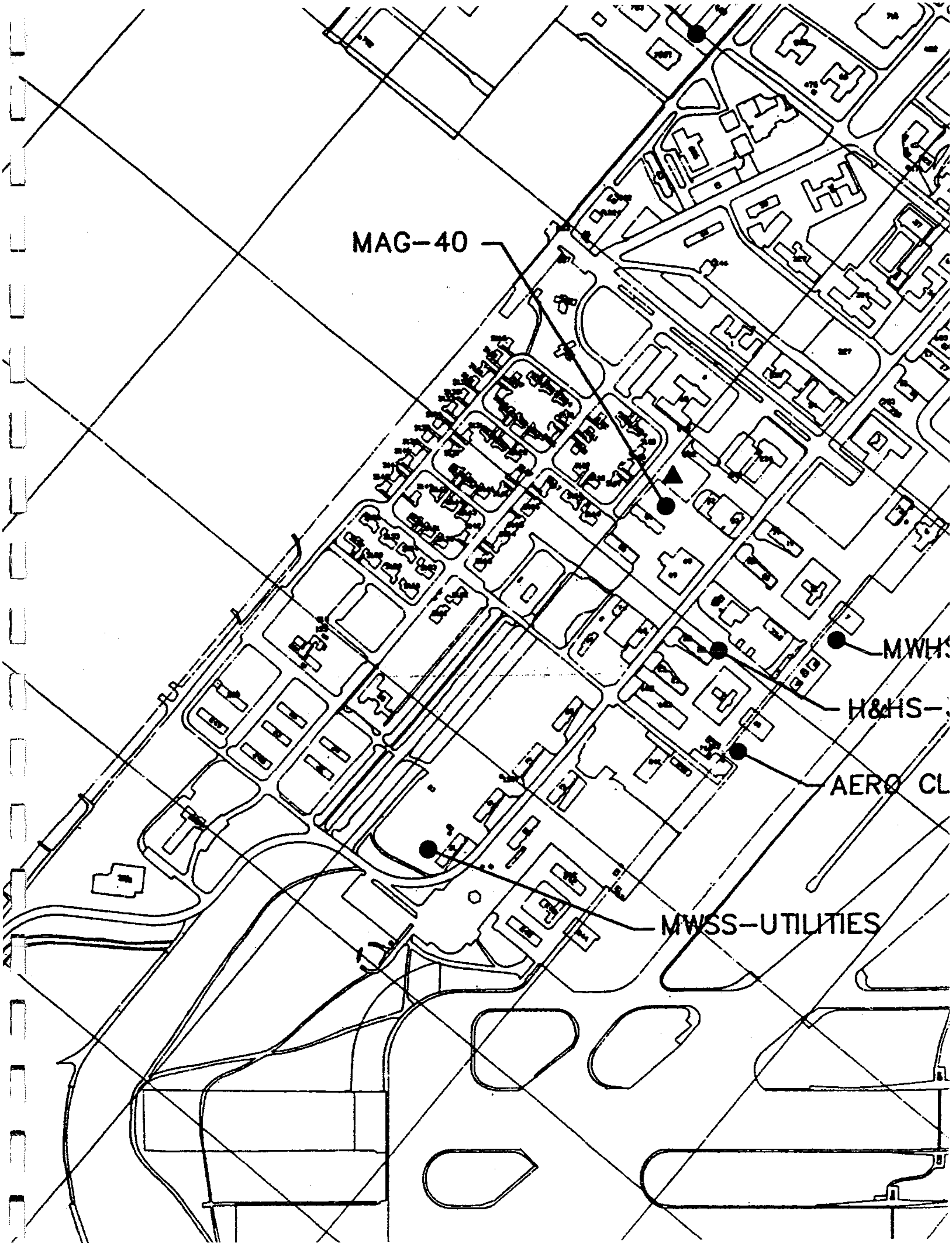
NOVEMBER 5, 1993

N

500' 250' 0 500' 1000'

1" = 500'

Science Applications International Corporation
An Employee-Owned Company

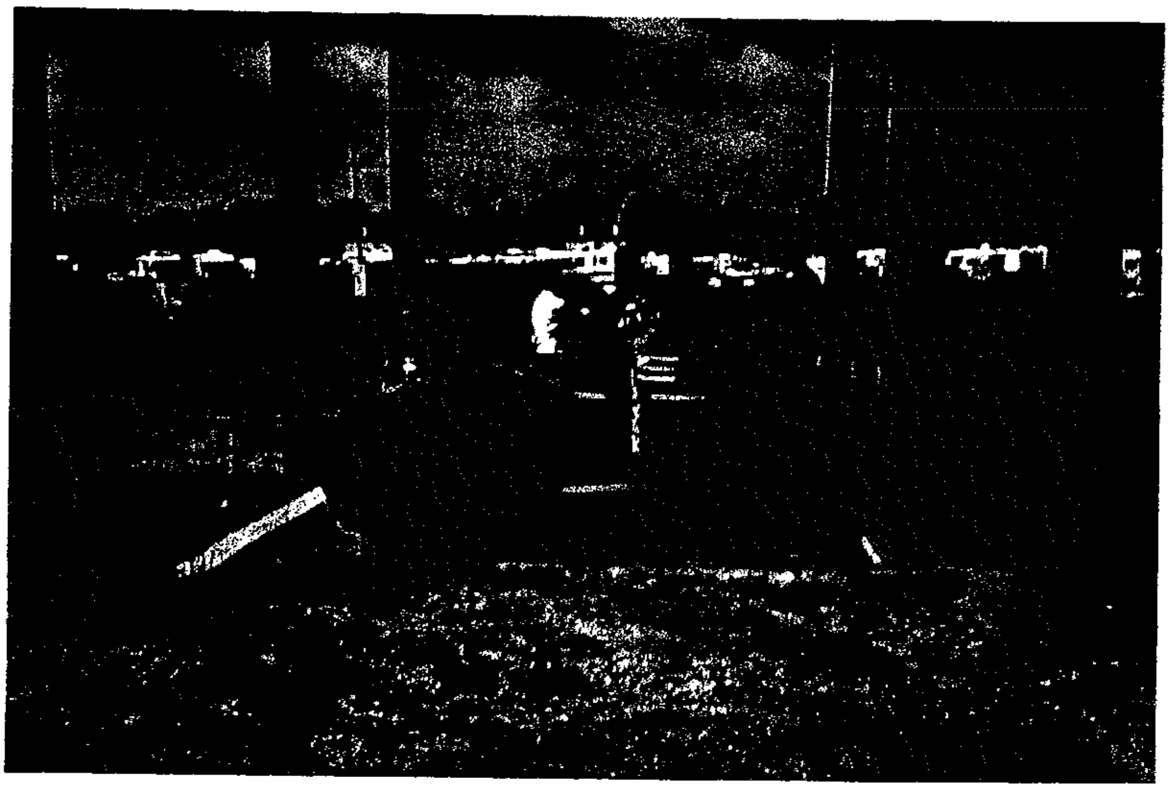

MAG-40
MWHS
H&HS-
AERO CL
MWSS-UTILITIES

Hazardous Waste Accumulation Point Summary		
Unit	Bldg #	Coordinates
Aero Club	10	R5
Armory	744	O2
Auto Hobby Shop	626	M3
CSSD-14	388	U8
Environmental Above Ground Storage Tank	n/a	U6
FMD Shops, Bldg 1601	370	T6
Fuels Division	314	U9
H&HS 38	22	R4
MACG-38 MWCS 38	HGR 5	R4
MAG-46	51	Q4
MAG-46 Fixed Wing	296	T9
MAG-46 Helo Mals-46	295	S8
MALS-11 Air Frames	130	M9
MALS-11 Avionics	856	Q12
MALS-11 Cryogenics (ALSS)	636	R12
MALS-11 GSE North	392	M9
MALS-11 Ordinance	673	P12
MALS-11 Power Plant	658	N10
MALS-11 Power Plant	634	N9
MALS-11 Supply	441	P12
Maytag Aircraft Corp	779	N10
MOD Team	115	N9
Motor Pool (G-4), Bldg 770	386	T7
MWHS-3	7	Q5
MWR Auto #1	651	O2
MWR Golf Course	390	P13
MWSS-Utilities	31	S4
MWSS-373 HQ	800	U10
MWSS-373 Refuelers	671	U9
SOMS HQ	289	N5
SOMS Maintenance	HGR 2	O4
SOMS Recovery		
Supply	320	U7
VMFA (AW)-121	462	R11
VMFA (AW) 225	698	N9
VMFA (AW)-242	461	R11
VMFAT-101	371	Q10
VMFA-323	606	N8
VMGR-352	297	T8
VFMA-314	605	N7

TABLE 6-3 (CONTINUED)
HAZARDOUS WASTES GENERATED BY UNITS[1]
MCAS EL TORO

Generator	Hazardous Waste Generated	Amount (lbs)
MWSS-373 (Utilities)	Absorbent w/fuel, oil	438
	Rags w/solvents	164
	Petroleum oil	338
SOMS	Absorbent w/fuel, oil	104
	Petroleum oil	218
SOMS RECOVERY	Absorbent w/oil debris	78
	Aerosol spray paint	193
	Petroleum oil	1,298
	Absorbent w/fuel, oil	136
	Diesel w/water	574
	Batteries (lead, acid)	150
VMFAT-101	Corrosion preventative cmpd	67
	Misc. paint	173
	Enamel paint	101
	Rags w/fuel, oil	1,063
	Rags w/AC paint thinner	159
	Absorbent w/fuel, oil	1,213
	Cleaning compound (sodium hydroxide)	66
	Cleaning compound (orthocresol)	687
	Hydraulic fluid	1,966
	Paint thinner	404
	JP-5	1,192
	Methyl Ethyl Ketone	96
	Oil w/lead	100
	Aliphatic isocyanate	168
	Water w/oil	1,500
	Sulfuric acid, spent	550
	Rags w/synthetic oil	100
	Paintbooth filters	218
VMFA-225 (AW)	Absorbent w/fuel, oil	260
	Polyurethane coating	108
	25% Freon w/75% hydraulic fluid	492
	Synthetic oil	124
	Rags w/solvents	150
VMFA-242	Aerosol spray paint	127
	Rags w/fuel, oil	140
	Cleaning compound	1,318
	Misc. paint	174
	Synthetic oil	466
	JP-5	312
	Absorbent w/fuel, oil	136
	Diesel w/water	574
	Batteries (lead, acid)	150

Marine Wing Support Squadron Utilities (MWSS Utilities) Bldg 31



Marine Wing Support Squadron Utilities (MWSS Utilities) Bldg 31

APPENDIX D
EXCERPTS FROM SWPPP REPORT

STORM WATER POLLUTION PREVENTION PLAN
(SWPPP)

EXTRACTS

FOR

MARINE CORPS AIR STATION EL TORO
EL TORO, CALIFORNIA

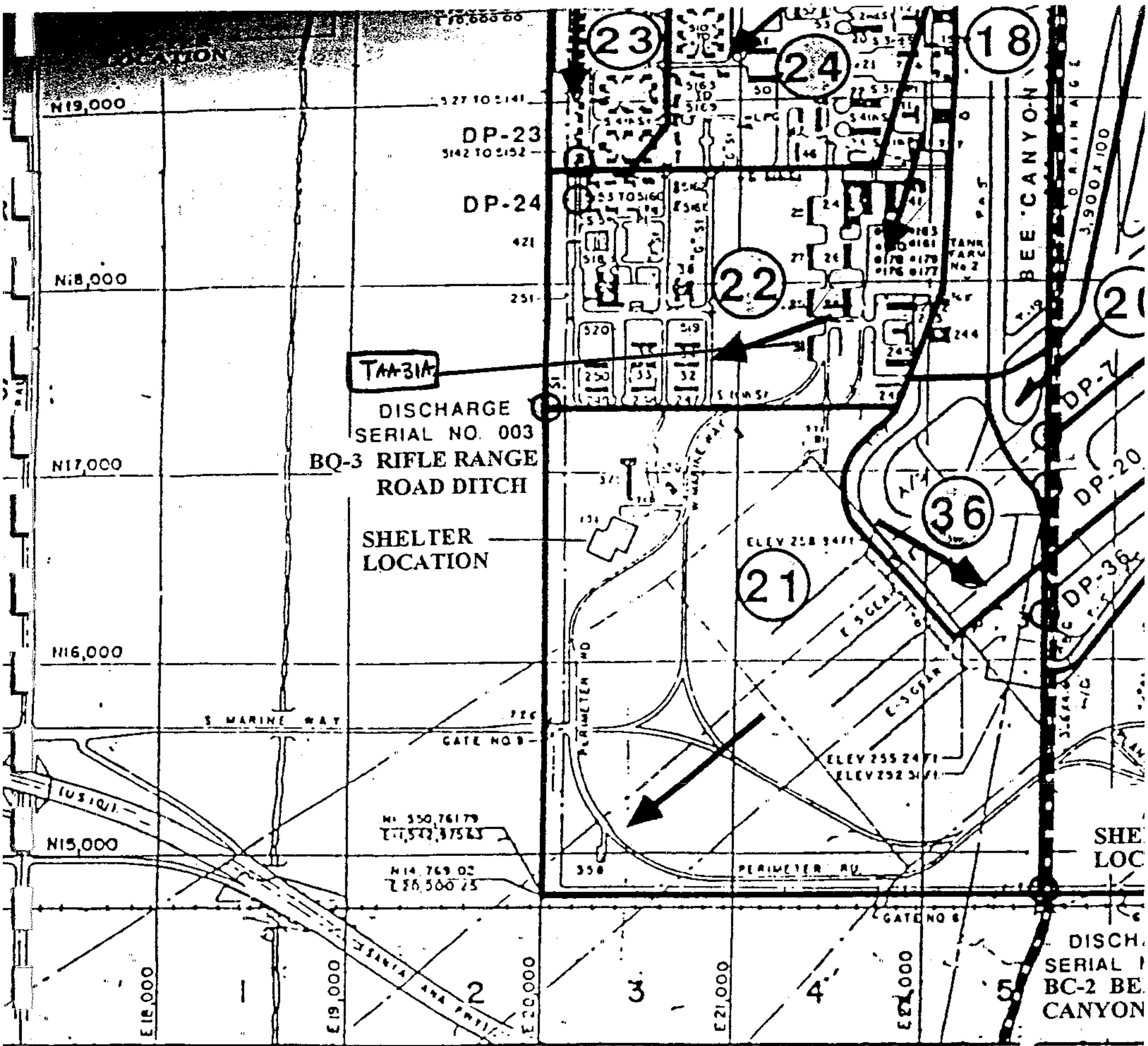
Annotations made by the writer of the Summary Report are identified with a star symbol or an arrow.

CONTRACT NO. N68711-96-D-2059
DELIVERY ORDER NO. 0002

VOLUME 1

JULY, 1997

INTEGRATED ENVIRONMENTAL MANAGEMENT, INC.



N19,000
N18,000
N17,000
N16,000
N15,000
DP-23
DP-24
DP-7
DP-20
DP-36
23
24
18
22
21
36
TAA-31A
DISCHARGE
SERIAL NO. 003
BQ-3 RIFLE RANGE
ROAD DITCH
SHELTER
LOCATION
BEE CANYON
S MARINE WAY
GATE NO 8
GATE NO 6
PERIMETER RD
ELEV 255.24 FT
ELEV 252.34 FT
TANK FARM No 2
SANTA ANA FWY
E 18,000
E 19,000
E 20,000
E 21,000
1
2
3
4
5
DISCH
SERIAL
BC-2 BE
CANYON
SHE
LOC

5.22 DRAINAGE BASIN 22

This drainage basin comprises all the buildings in Areas 21 and 22. It has an area of about 65 acres.

5.22.1 Buildings of Limited Concern

The following buildings do not use, handle transport, or store significant quantities of industrial materials nor do they generate significant amounts of liquid or solid pollutants, and they do not appear to be of concern to the quality of storm water discharges:

TABLE 5-19
BASIN 22
BUILDINGS OF LIMITED CONCERN

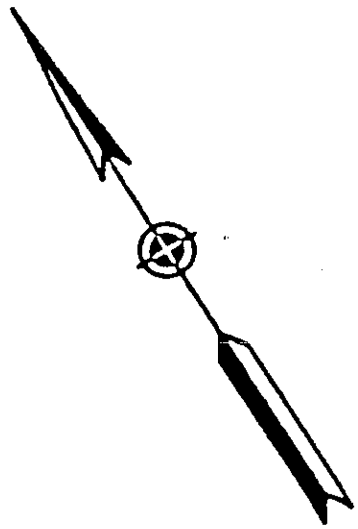
BLDG #	DESCRIPTION	TENANT
7	Storage out of Stores	MWHS-3
8	Storage out of Stores	MTACS-38
9	Storage out of Stores	MTACS-38
11	Squadron Headquarters	MTACS-38
25*	Construction Shop	MWSS-373
26	Communications Shop	MWSS-373
27	Food Services Storage PMO Storage	MWSS-373 PMO
28	Food Services	MWSS-373
29	Storage NIS Field Office	3rd MAW G-2 NIS
31*	Utilities Shop/TAFDS	MWSS-373
32	BOQ, W-1/O-2	Station/G-4
33	BOQ, W-1/O-2 Transients	Station/G-4
34	BOQ, W-1/O-2	Station/G-4

TABLE 5-19
BASIN 22
BUILDINGS OF LIMITED CONCERN

BLDG #	DESCRIPTION	TENANT
35	BOQ, w-1/O-2, Transients	Station/G-4
38	Museum Storage	Station/G-4
152*	Ground Equipment Shed	Installation
240	Contract Refueler Facility	Supply (Vacant)
241	Storage Laundry Pickup Point	Vacant Vacant
242	Museum	Station Training
243	Historical Center	Training
245	Storage Air/Ground	MWSG-37
248	BOQ Quarters	Station/G-4
249	VIP Quarters (Transients)	Station/G-4
250	VIP Quarters (Transients)	Station/G-4
251	Conference Center Recreation Pavilion Bathhouse	Station/G-4 Station/G-4 Training
421	Playing Courts, Tennis	MWR-Rec
520	Wading Pool	Training
657	Visitor/Vehicle Registration	PMO
683	Cold Storage Warehouse General Warehouse MC	Supply Supply
729	Main Gate Sentry House	PMO
771*	Hazardous Waste Collection Facility	MWSG-37
889	Vintage Aircraft Display Shelter	Station

* Buildings with an asterisk indicate facilities which were not involved in any industrial activities or did not store any hazardous materials at the time of our field observations.

20, 26 & 29.



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IEM

3002 DOW AVENUE, SUITE 412 TUSTIN, CALIFORNIA 92782

EL TORO MCAS OUTFALL AND DRAINAGE BASIN LOCATION MAP

JOB NO.: N68711-96-D-2059	REVISIONS:
DATE: OCTOBER 4, 1996	
SCALE: 1" = 600'	
DRAWN BY.	
CHECKED BY:	
SHEET OF	

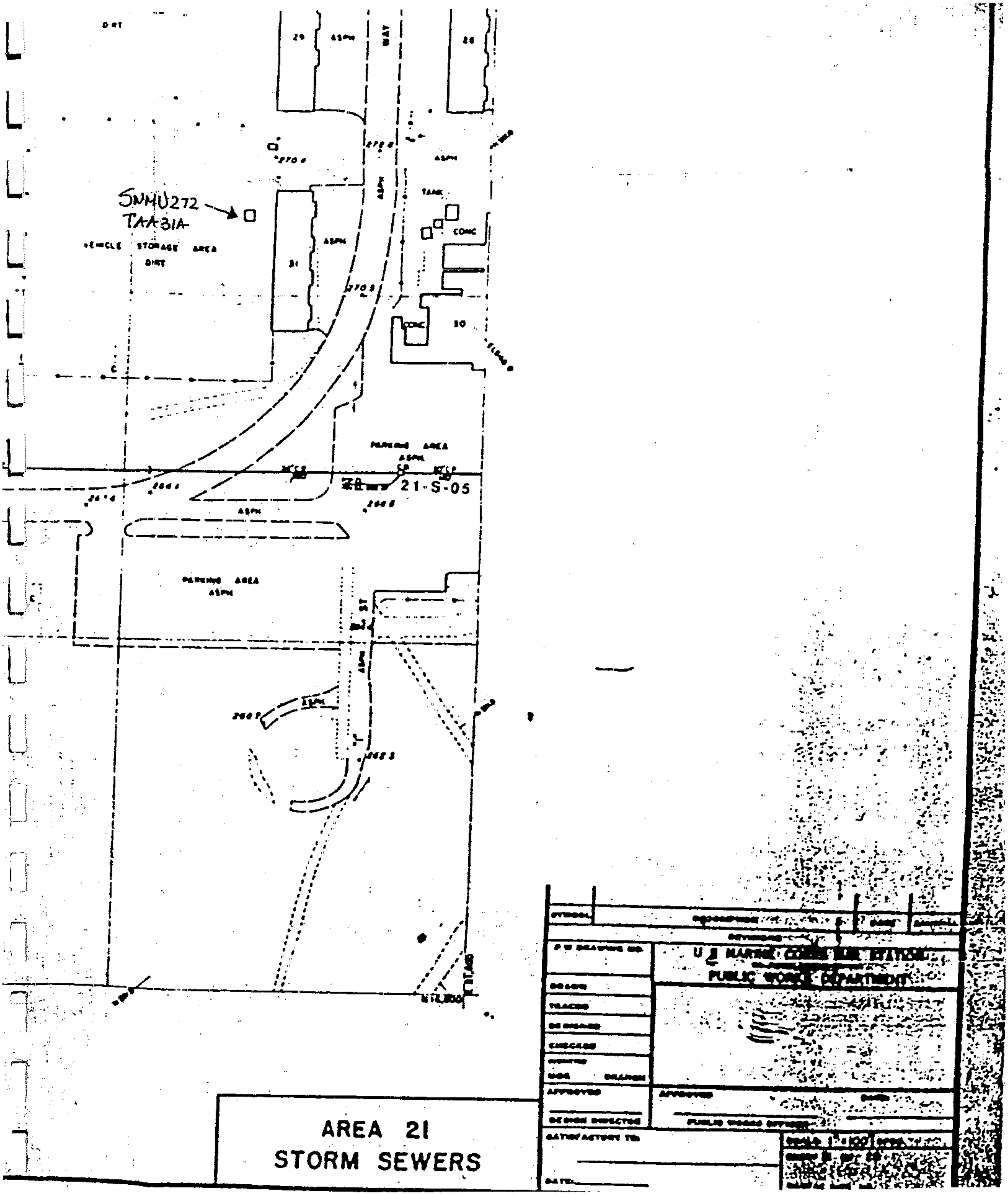

SWMU272
TAA31A
VEHICLE STORAGE AREA
DIRT
ASPH
CONC
TANK
PARKING AREA
ASPH
21-S-05
U S MARINE CORPS AIR STATION
PUBLIC WORKS DEPARTMENT
AREA 21
STORM SEWERS

TABLE 5-20

BASIN 22

SUMMARY OF BMPs

BLDG #	BASIN	BUILDING DESCRIPTION	TENANT	Concern Level	BMP STATUS	BMP #	BMP Description
31	22	Utilities Shop/TAFDS	MWSS-373	Previous			No Additional BMPs Recommended
32	22	BOQ, W-1/O-2	Station/G-4	Limited			No Additional BMPs Recommended
33	22	BOQ, W-1/O-2 Transients	Station/G-4	Limited			No Additional BMPs Recommended
34	22	BOQ, W-1/O-2	Station/G-4	Limited			No Additional BMPs Recommended
35	22	BOQ, w-1/O-2, Transients	Station/G-4	Limited			No Additional BMPs Recommended
38	22	Museum Storage	Station/G-4	Limited			No Additional BMPs Recommended
152	22	Ground Equipment Shed	Installation	Previous			No Additional BMPs Recommended
240	22	Contract Refueler Facility	Vacant	Limited		010	Perform Routine Maintenance and Discharge Prevention for Oil/Water Separator
240	22	Contract Refueler Facility	Supply (Vacant)	Limited			No Additional BMPs Recommended
241	22	Storage	Vacant	Limited		011	Avoid/Minimize Hosing Down Sites
241	22	Storage Laundry Pickup Point	Vacant Vacant	Limited			No Additional BMPs Recommended
242	22	Museum	Station Training	Limited			No Additional BMPs Recommended

TABLE 6.1
MCAS EL TORO
STATIONWIDE SUMMARY OF BMPs

BLDG #	BASIN	BUILDING DESCRIPTION	TENANT	Concern Level	BMP STATUS	BMP #	BMP Description
19	24	Squadron Headquarters	MWHS-3	Limited			No Additional BMPs are Recommended
20	24	Maintenance Storage Storage out of Stores	13th Dental MWHS-3	Previous			No Additional BMPs are Recommended
21	24	General Storage Shed	MWCS-38	Limited			No Additional BMPs are Recommended
22	24	Electrical/Communications Maint. Shop	MTACS-38	Previous			No Additional BMPs are Recommended
23	24	Storage out of Stores	MTACS-38	Limited			No Additional BMPs are Recommended
25	22	Construction Shop	MWSS-373	Previous			No Additional BMPs Recommended
26	22	Communications Shop	MWSS-373	Limited			No Additional BMPs Recommended
27	22	Food Services Storage PMO Storage	MWSS-373 PMO	Limited			No Additional BMPs Recommended
28	17	Food Services	MWSS-373	Limited			No Additional BMPs are Recommended
28	22	Food Services	MWSS-373	Limited			No Additional BMPs Recommended
29	22	Storage NIS Field Office	3rd MAW G-2 NIS	Limited			No Additional BMPs Recommended
31	22	Utilities Shop/TAFDS	MWSS-373	Previous			No Additional BMPs Recommended
32	22	BOQ, W-1/O-2	Station/G-4	Limited			No Additional BMPs Recommended

TABLE 7-1
MCAS EL TORO MATERIALS INVENTORY

BLDG #	BASIN	BUILDING DESCRIPTION	TENANT	Concern Level	TRADE/COMMON NAME	MAX. DAY	AVE. Day	CONT.
31	22	Utilities Shop/TAFDS	MWSS-373	Previous	Antifreeze	55 gal	25 gal	55 gal
31	22	Utilities Shop/TAFDS	MWSS-373	Previous	Citric Acid, Anhydrous	2112 lb	200 lb	50 lb
31	22	Utilities Shop/TAFDS	MWSS-373	Previous	Coagulant, Water Treatment	1265 lb	100 lb	5 lb
31	22	Utilities Shop/TAFDS	MWSS-373	Previous	Diesel Fuel	55 gal	25 gal	55 gal
31	22	Utilities Shop/TAFDS	MWSS-373	Previous	Lubricating Oil, 30W	55 gal	25 gal	55 gal
31	22	Utilities Shop/TAFDS	MWSS-373	Previous	Lubricating Oil, 80/90W	55 gal	25 gal	55 gal
31	22	Utilities Shop/TAFDS	MWSS-373	Previous	Sodium Hexametaphostate	554 lb	50 lb	100 lb
49	24	Storage out of Stores Squadron Headquarters Academic Instruction	MWSS-373 MWSS-373 MWSS-373	Concern	Diesel Fuel	N/A	N/A	N/A
49	24	Storage out of Stores Squadron Headquarters Academic Instruction	MWSS-373 MWSS-373 MWSS-373	Concern	Waste Oil	N/A	N/A	N/A
57	17	Bathhouse	Training	Limited	Sodium Hypochlorite	500 gal	100gal	500 gal
99	17	Flight Line Storage	SOMS	Concern	Lubricating Oil	N/A	N/A	N/A
99	17	Flight Line Storage	SOMS	Concern	Solvent	N/A	N/A	N/A
114	08	Maint Hngr Space	HMM-166	Concern	Diesel Fuel	N/A	N/A	N/A

APPENDIX E
EXCERPTS FROM BCP AND EBS REPORT

United States Marine Corps

Base Realignment and Closure Business Plan

For

Marine Corps Air Station El Toro, CA

March 2001

Table 2
Site Summary
(Sheet 27 of 43)

Database Tracking	Reuse Parcel	Description	Material Disposed	Date of Operation	Status	Regulatory Mechanism	NFA	NFA Date	Comments	ECP Area Type	Approx. ECP Area (acres)
TAA 22	9B	< 90-day accumulation area-Bldg 22			Inactive					3	0.18
TAA 31A	9B	< 90-day accumulation area-Bldg 31			Inactive				SWMU/AOC 272	6	0.18
TAA 31B	9B	< 90-day accumulation area-Bldg 31			inactive					3	0.18
TAA 51	9B	< 90-day accumulation area-Bldg. 51			Inactive				SWMU/AOC 33	6	0.18
TAA 77	9B	< 90-day accumulation area-Bldg. 77			Closed	DTSC	X	3/9/99		4	0.18
TAA 115	12D	< 90-day accumulation area-Bldg. 115			inactive				SWMU/AOC 39	3	0.18
TAA 130A	12B	< 90-day accumulation area-Bldg. 130			inactive	DTSC			SWMU/AOC 294	6	0.18
TAA 130B	12B	< 90-day accumulation area-Bldg. 130			Inactive	DTSC			SWMU/AOC 295	6	0.18
TAA 130C	12B	< 90-day accumulation area-Bldg. 130			inactive				SWMU/AOC 42	6	0.18
TAA 155A	11A	< 90-day accumulation area-Bldg. 155			Inactive				SWMU/AOC 240	6	0.18
TAA 155B	11A	< 90-day accumulation area-Bldg. 155			inactive				SWMU/AOC 241	6	0.18
TAA 155C	11A	< 90-day accumulation area-Bldg. 155			Inactive				SWMU/AOC 45	6	0.18
TAA 240	9B	< 90-day accumulation area-Bldg. 240			inactive				SWMU/AOC 64	6	0.18
TAA 289	8	< 90-day accumulation area-Bldg. 289			inactive				SWMU/AOC 70	6	0.18
TAA 297	11A	< 90-day accumulation area-Bldg. 297			Inactive				SWMU/AOC 73	6	0.18
TAA 306	11A	< 90-day accumulation area-Bldg. 306			inactive				SWMU/AOC 88	6	0.18
TAA 307	11A	< 90-day accumulation area-Bldg. 307			Inactive					6	0.18
TAA 314	11A	Fuel storage locker-Bldg. 314			Closed	DTSC	X	3/16/99	SWMU/AOC 269	4	0.18
TAA 359B	13F	< 90-day accumulation area-Bldg. 359			Inactive				SWMU/AOC 99	6	0.18

Table 3
Site Summary by Reuse Parcel
(Sheet 15 of 36)

Database Tracking	Reuse Parcel	Description	Material Disposed	Date of Operation	Status	Regulatory Mechanism	NFA	NFA Date	Comments	ECP Area Type	Approx. ECP Area
TAA 5A	9B	< 90-day accumulation area-Bldg. 5			inactive				SWMU/AOC 25	7	0.18
TAA 5B	9B	< 90-day accumulation area-Bldg 5			inactive				SWMU/AOC 26	6	0.18
TAA 7	9B	< 90-day accumulation area-Bldg 7			inactive					7	0.18
TAA 10	9B	< 90-day accumulation area-Bldg 10			inactive				SWMU/AOC 27	7	0.18
TAA 22	9B	< 90-day accumulation area-Bldg 22			inactive					3	0.18
TAA 31A	9B	< 90-day accumulation area-Bldg 31			inactive				SWMU/AOC 272	6	0.18
TAA 31B	9B	< 90-day accumulation area-Bldg 31			inactive					3	0.18
TAA 51	9B	< 90-day accumulation area-Bldg. 51			inactive				SWMU/AOC 33	6	0.18
TAA 77	9B	< 90-day accumulation area-Bldg. 77			Closed	DTSC	X	3/9/99		4	0.18
TAA 240	9B	< 90-day accumulation area-Bldg. 240			inactive				SWMU/AOC 64	6	0.18
TAA 651	9B	< 90-day accumulation area-Bldg. 651			inactive				SWMU/AOC 165	6	0.18
UST 1A	9B	500 gal.	Diesel (stored)	Inst. 1943	Closed	RWQCB	X	10/2/96		4	0.18
UST 1B	9B	500 gal.	Diesel (stored)	Inst. 1943	Removed	RWQCB				2	0.18
UST 11	9B	500 gal.	Diesel (stored)	inst. 1943	Closed	RWQCB	X	8/16/96		4	0.18
UST 12	9B	500 gal.	Diesel (stored)	inst. 1943	Closed	RWQCB	X	12/12/95		4	0.18
UST 13	9B	500 gal.	Diesel (stored)	inst. 1943	Closed	OCHCA	X	5/23/96		4	0.18
UST 14	9B	500 gal.	Diesel (stored)	inst. 1943	Closed	RWQCB	X	5/19/97		4	0.18
UST 24	9B	500 gal.	Diesel (stored)	inst. 1943	Closed	RWQCB	X	12/9/96		4	0.18
UST 32	9B	500 gal.	Diesel (stored)	inst. 1943	Closed	RWQCB	X	3/12/96		4	0.18
UST 33	9B	500 gal.	Diesel (stored)	inst. 1943	Closed	RWQCB	X	10/30/96		4	0.18
UST 34	9B	500 gal.	Fuel oil (stored)	Inst. 1943	Closed	RWQCB	X	3/12/96		4	0.18
UST 35	9B	500 gal.	Fuel oil (stored)	inst. 1943	Closed	RWQCB	X	10/30/96		4	0.18
UST 37	9B	500 gal.	Diesel (stored)	inst. 1943	Closed	OCHCA	X	11/7/96		4	0.18
UST 38	9B	1,500 gal.	Fuel oil (stored)	inst. 1943	Closed	RWQCB	X	11/21/97		4	0.18
UST 40	9B	500 gal.	Diesel (stored)	inst. 1943	Closed	OCHCA	X	11/7/96		4	0.18
UST 41	9B	500 gal.	Diesel (stored)	inst. 1943	Closed	OCHCA	X	11/7/96		4	0.18
UST 42	9B	500 gal.	Fuel oil (stored)	inst. 1943	Closed	OCHCA	X	11/7/96		4	0.18
UST 43	9B	500 gal.	Fuel oil (stored)	inst. 1943	Closed	RWQCB	X	12/11/95		4	0.18
UST 44	9B	500 gal.	Diesel (stored)	inst. 1943	inactive	RWQCB	X	3/31/00		2	0.18
UST 45	9B	500 gal.	Fuel oil (stored)	inst. 1943	inactive	RWQCB	X	3/31/00		2	0.18

MARINE CORPS AIR STATION EL TORO
EL TORO, CALIFORNIA
INSTALLATION RESTORATION PROGRAM
FINAL ENVIRONMENTAL
BASELINE SURVEY REPORT

01 April 1995

Revision 0

PREPARED BY:
Southwest Division, Naval Facilities
Engineering Command
1220 Pacific Highway
San Diego, California 92132-5190

THROUGH:
CONTRACT #N68711-89-D-9296
CTO #284
DOCUMENT CONTROL NO:
CLE-C01-01F284-S2-0004

WITH:
Jacobs Engineering Group Inc.
401 West A Street, Suite 1905
San Diego, California 92101

In association with:
International Technology Corporation
CH2M HILL

Table 3-7
Less Than 90-Day Accumulation Area Inventory
MCAS El Toro EBS Report - April 1995

Database Tracking	Building Number	Status	SWMU/ AOC	Comments	AREA TYPE
SAA 2	2	Active		Identified in 1994 SPCC Plan	7
SAA 5A	5	Inactive	25	Sampling Visit Not Recommended During PR/VSI	2
SAA 5B	5	Active	26	RFA recommended excavation of shallow stained soil.	6
SAA 7	7	Inactive		Identified in 1994 SPCC Plan	7
SAA 10	10	Active	27	RFA recommended NFA	2*
SAA 19	19	Active		Identified in Station's HW Open Drum Inspection Report	7
SAA 22	22	Active		Identified in 1994 SPCC Plan	7
SAA 29A	29	Inactive	30	RFA recommended NFA	3*
SAA 29B	29	Inactive	31	Sampling Visit Not Recommended During PR/VSI	7
SAA 31A	31	Active	272	RFA recommended NFA	3
SAA 31B	31	Inactive		Identified in 1994 SPCC Plan	7
SAA 51	51	Active	33	Excavate Shallow Stained Soil	6
SAA 77	77	Active		Identified in Station's HW Open Drum Inspection Report	7
SAA 114	114	Inactive	38	Sampling Visit Not Recommended During PR/VSI	2
SAA 115	115	Active	39	Shallow Soil Borings Recommended	7
SAA 130A	130	Inactive	294	Sampling Visit Not Recommended During PR/VSI	2
SAA 130B	130	Active	295	Sampling Visit Not Recommended During PR/VSI	2
SAA 130C	130	Inactive	42	Sampling Visit Not Recommended During PR/VSI	2
SAA 155A	155	Inactive	240	No evidence of release	2
SAA 155B	155	Inactive	241	RFA recommended NFA	3
SAA 155C	155	Inactive	45	RFA recommended NFA	3
SAA 240	240	Inactive	64	Sampling Visit Not Recommended During PR/VSI	2
SAA 242	242	Inactive	67	Sampling Visit Not Recommended During PR/VSI	7
SAA 289	289	Active	70	RFA recommended NFA	3
IRP 7	295	Active	71	IRP Site 7 (1)	6
IRP 7	296	Active	72	IRP Site 7 (1)	6
SAA 297	297	Active	73	RFA recommended NFA	3
SAA 298	298	Inactive	83	RFA recommended NFA	2
SAA 306	306	Inactive	88	Shallow Soil Borings Recommended	7
SAA 307	307	Active		Identified in Station's HW Open Drum Inspection Report	7
SAA 314	314	Inactive	269	RFA recommended NFA	3
SAA 317	317	Inactive	93	Sampling Visit Not Recommended During PR/VSI	2
IRP 21	320	Active	94	IRP Site 21 (1)	6
SAA 357	357	Inactive	97	Sampling Visit Not Recommended During PR/VSI	2
SAA 359A	359	Inactive	254	Sampling Visit Not Recommended During PR/VSI	2
SAA 359B	359	Inactive	99	RFA recommended NFA	3
IRP 8	360	Inactive	104	IRP Site 8 (1)	6
IRP 8	360	Inactive	105	IRP Site 8 (1)	6
IRP 8	360	Inactive	106	IRP Site 8 (1)	6
SAA 370	370	Active		Identified in 1994 SPCC Plan	7
SAA 371A	371	Active	107	RFA recommended NFA	2
SAA 371B	371	Inactive	242	RFA recommended NFA	3
SAA 386	386	Active	114	Sampling Visit Not Recommended During PR/VSI	2
SAA 388A	388	Active	116	RFA recommended NFA	3
SAA 388B	388	Inactive	251	Sampling Visit Not Recommended During PR/VSI	2
SAA 389A	389	Inactive	119	Sampling Visit Not Recommended During PR/VSI	2
SAA 389B	389	Inactive	259	Sampling Visit Not Recommended During PR/VSI	2
SAA 390A	390	Active	122	Sampling Visit Not Recommended During PR/VSI	2
SAA 390B	390	Inactive	261	RFA recommended NFA	3
SAA 392A	392	Active	124	RFA recommended NFA	3
SAA 392B	392	Inactive	271	RFA recommended NFA	3
SAA 398	398	Inactive	252	RFA recommended NFA	3

Table 3-7
Less Than 90-Day Accumulation Area Inventory
MCAS El Toro EBS Report - April 1995

Database Tracking	Building Number	Status	SWMU/ AOC	Comments	AREA TYPE

NOTES:
(1) - SWMUs/AOCs that were determined to be located within RI/FS site boundaries were eliminated from RFA sampling visits. These SWMUs/AOCs will be investigated in the IRP.
(2) - Accumulation areas are currently being evaluated for removal and/or decontamination strategies.
* - Indicates RFA recommendation of "no further action" is pending U.S. EPA approval.
PR/VSI - Preliminary Review/Visual Site Inspection performed as part of the RFA.
IRP - Installation Restoration Program
RFA - RCRA Facility Assessment
NFA - No Further Action

Sources:
Jacobs, 1993. MCAS El Toro Final RCRA Facility Assessment Report.
MCAS El Toro Hazardous Waste Open Drum Inspection Report Sheet
SAIC, 1994. Draft Oil and Hazardous Substances Spill Prevention and Countermeasure Plan and Contingency Plan (SPCC).

Table 4-1
Definitions of BCP Area Types
MCAS El Toro EBS Report - April 1995

Area Type	Definition
1	Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas).
2	Areas where only storage of hazardous substances or petroleum products has occurred (but no release, disposal, or migration from adjacent areas has occurred).
3	Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, but at concentrations that do not require a removal or remedial action.
4	Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, and all remedial actions necessary to protect human health and the environment have been taken.
5	Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, removal and/or remedial actions are underway, but all required remedial actions have not yet been taken.
6	Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, but required response actions have not yet been implemented.
7	Areas that are unevaluated or require additional evaluation to assess whether a release will require remedial action.

Source: Department of Defense, BRAC Cleanup Plan (BCP) Guidebook.

APPENDIX F
JEG RFA BACKGROUND INFORMATION

MARINE CORPS AIR STATION EL TORO
EL TORO, CALIFORNIA
INSTALLATION RESTORATION PROGRAM
FINAL RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) FACILITY ASSESSMENT REPORT

VOLUME I

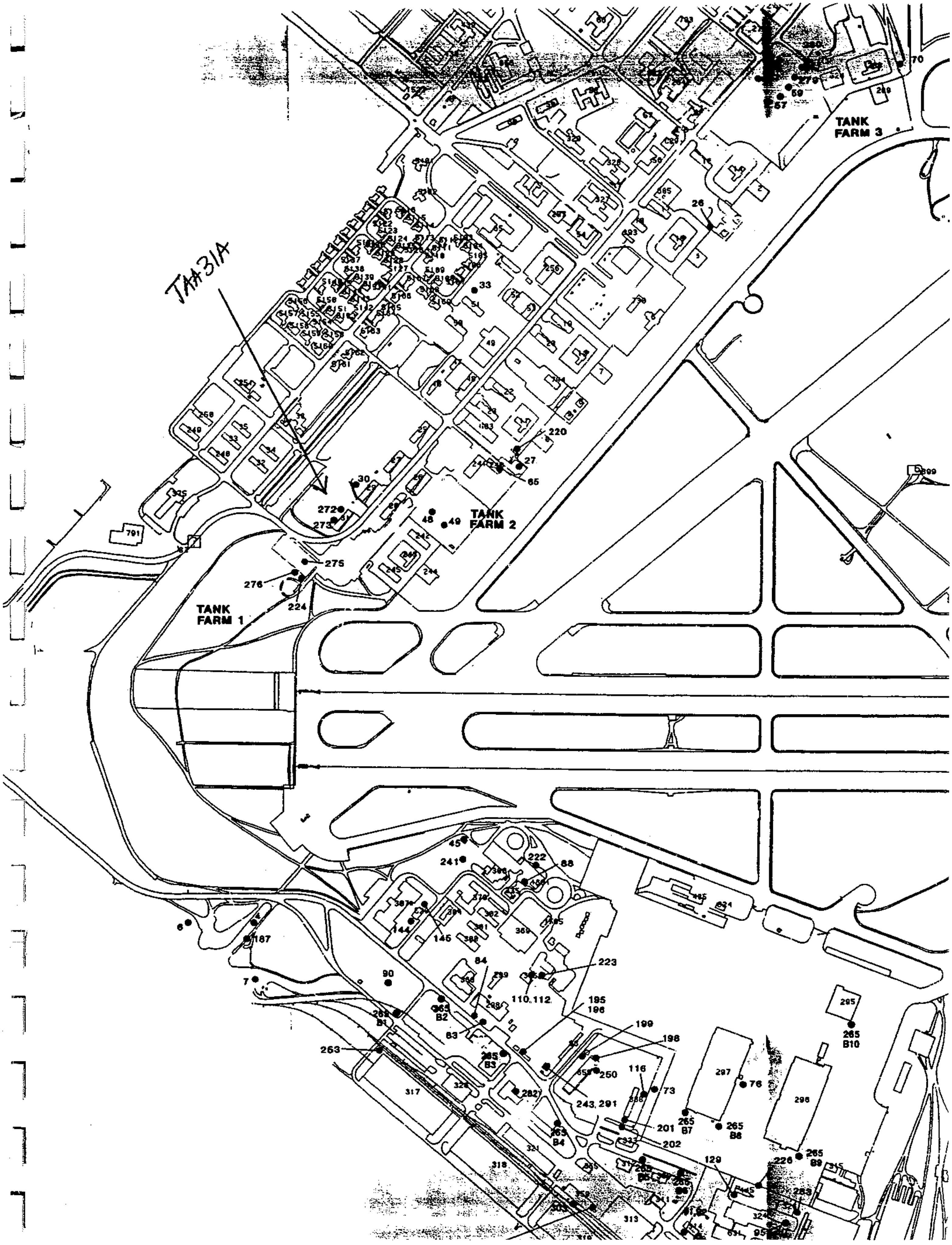
16 July 1993

PREPARED BY:
Southwest Division, Naval Facilities
Engineering Command
1220 Pacific Highway
San Diego, California 92132-5190

THROUGH:
CONTRACT #N68711-89-D-9296
CTO #193
DOCUMENT CONTROL NO:
CLE-C01-01F193-S2-0001

WITH:
Jacobs Engineering Group Inc.
3655 Nobel Drive, Suite 200
San Diego, California 92122

In association with:
International Technology Corporation
CH2M HILL


TAA31A
TANK FARM 1
TANK FARM 2
TANK FARM 3

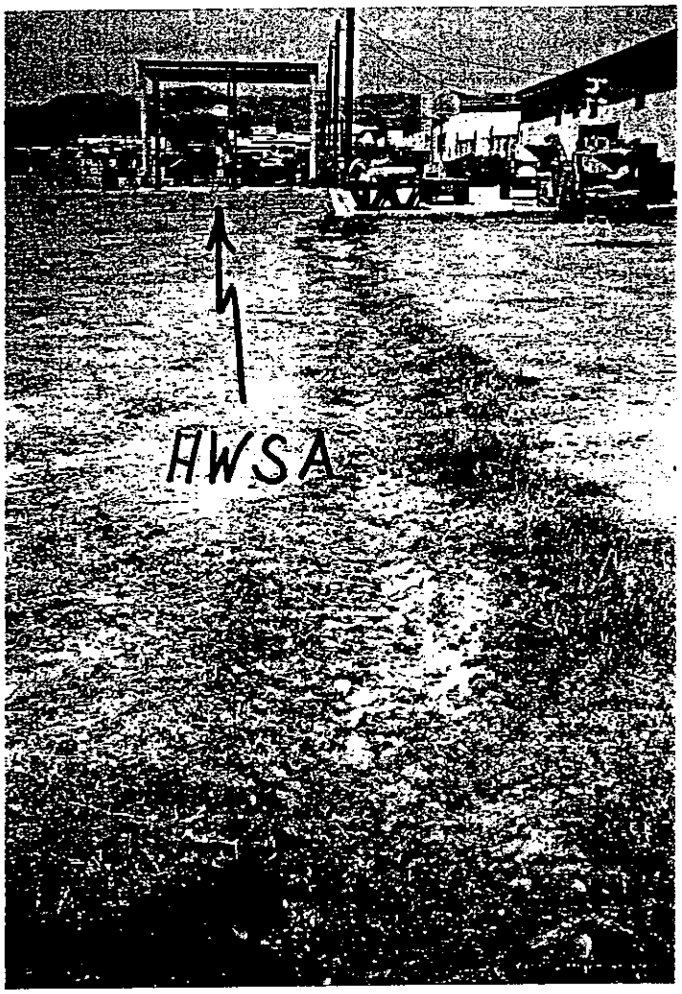
Evaluation Form
SWMU/Area of Concern
Number 272

Name: Hazardous Waste Storage Area

Location: Building 31

Size: 144 sq ft

Date of Site Visit: 14 May 1991



Period of Operation

Currently active

Evaluation Form
SWMU/Area of Concern
Number 272

Unit Characteristics

The hazardous waste storage area (HWSA) is located approximately 40 ft northwest of Building 31. The HWSA consists of a concrete pad with a 6-in. concrete berm. The HWSA has an aluminum roof covering and a sump. The HWSA is bordered on all sides by unpaved soil. There was no staining observed on the concrete pad or ground surface around the HWSA.

Waste Characteristics

Waste oil
Hydraulic fluid

Possible Migration Pathways

Soil

Evidence of Release

None observed

Exposure Potential

Authorized on-Station personnel

Recommendations

Although there is no evidence of a release at this HWSA, a sampling visit is recommended for the HWSAs at the Station.

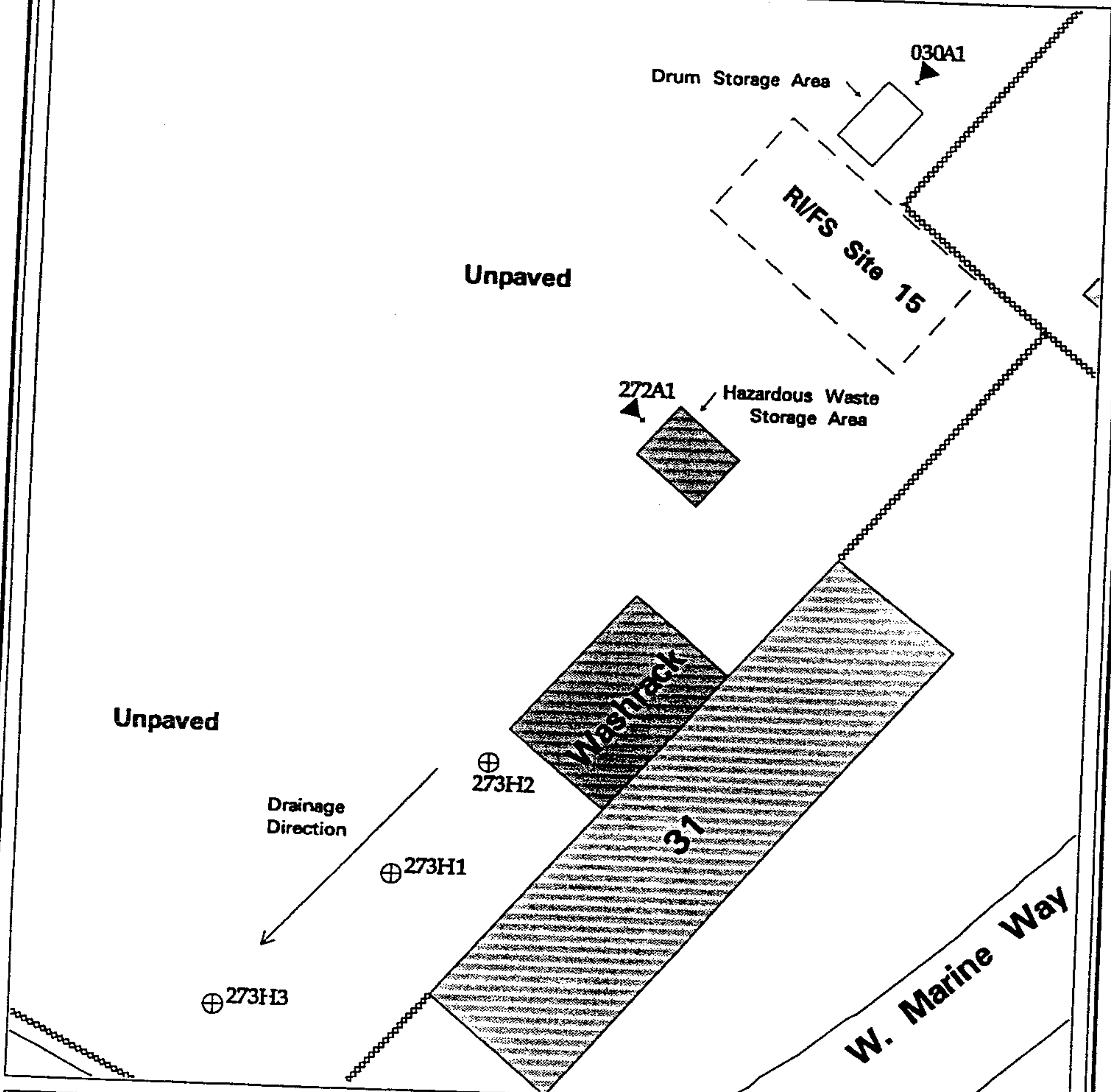


Figure 17 Sample Location Map

Boring Location and Number:

123H4 5' Deep Boring
123B4 25' Deep Boring
123A4 60' Long, Angle Boring

Scale

0 20 40 80 Feet

Features:

Building
Concrete
Fence
Railroad

SWMU/AOC Number and Type:

30 - Drum Storage Area
272 - Hazardous Waste Storage Area
273 - Washrack

MCAS El Toro
RCRA Facility Assessment

TABLE 5-1 CHEMICAL ANALYSES AT SWMUs AND AREAS OF CONCERN MCAS EL TORO RFA								
SWMU/ AOC Number	Volatile Organics	Semi-Volatile Organics	TPH	TFH	Pesticides/ PCBs	Metals	Cyanide	Dioxins/ Furans
270	X		X					
271	X	X	X	X	X	X		
272	X	X	X	X	X	X		
273	X		X					
275	X		X	X				
276	X		X	X				
277	X		X	X				
278	X		X	X				
279	X		X	X				
280	X		X	X				
282	X		X	X				
283	X		X	X				
286	X		X	X				
287	X		X	X				
291	X		X					
296	X		X					
298	X		X					
300	X	X	X	X	X	X		X (1)
301	X		X					
302	X		X					
303	X	X	X	X	X	X		

Notes:

(1) Dioxins analyzed only at the 10-foot sample at Boring 1.

VOCs, SVOCs, Pesticides/PCBs, metals, and cyanide analyses done per CLP methodology

TPH analyses done per EPA Method 418.1

TFH analyses done per California Leaking Underground Fuel Tank (LUFT) Manual methodology

Dioxins/Furans analyses done per EPA Method 8280

SUMMAR... SAMPLING VISIT RESULTS
MCAS EL TORO RFA

SWMU/AOC	DESCRIPTION	TPH/TFH and Volatiles: TPH/TFH < 100 ppm	TPH/TFH < 1000 ppm	TPH/TFH >1000 ppm	VOC < CRDL	VOC < ETM & PRG	VOC > ETM & PRG	SVOCs: < CRDL	SVOCs: < ETM & PRG	SVOCs: > ETM & PRG	PESTICIDES/PCBs: < CRDL	PESTICIDES/PCBs: < ETM & PRG	PESTICIDES/PCBs: > ETM & PRG	METALS: < BGT	METALS: < ETM & PRG	METALS: > ETM & PRG	RECOMMENDATIONS
229	Hazardous Waste Storage Area	X			X			X			X			X			No Further Action
231	Underground Storage Tank		X		X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
232	Oil/Water Separator	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
233	Oil/Water Separator	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
234	Hazardous Waste Storage Area	X			X			X			X				X		No Further Action
241	Drum Storage Area		X		X			X			X				X		No Further Action
242	Hazardous Waste Storage Area	X			X			X			X				X		No Further Action
243	Wash Rack	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
244	PCB Spill Area	X			X			NA	NA	NA			X	NA	NA	NA	No Further Action
246	Oil/Water Separator		X		X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
249	Underground Storage Tank	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
250	Underground Storage Tank		X			X		NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
252	Hazardous Waste Storage Area	X			X			X				X			X		No Further Action
253	Wash Rack	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
255	Hazardous Waste Storage Area	X			X			X			X			X			No Further Action
256	Hazardous Waste Storage Area	X			X			X				X			X		No Further Action
257	Wash Water Runoff Site	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
258	Wash Water Runoff Site	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
260	Above Ground Storage Tank		X		X			NA	NA	NA	NA	NA	NA	NA	NA	NA	Repair cracks in pavement.
261	Drum Storage Area	X			X			X			X				X		No Further Action
262	Fuel Storage Area	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
263	Underground Storage Tank	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
264	Equipment Storage Area		X		X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
265	Metal Plating Sewer Lines		X		X			X				X				X	No Further Action
266	Fuel Storage Locker		X		X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
270	Wash Rack	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
271	Hazardous Waste Storage Area	X			X				X		X				X		No Further Action
272	Hazardous Waste Storage Area	X			X			X			X				X		No Further Action
273	Wash Rack	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
275	Underground Storage Tank	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
276	Underground Storage Tank		X		X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
277	Underground Storage Tank			X		X		NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
278	Underground Storage Tank	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
279	Underground Storage Tank	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
280	Underground Storage Tank			X		X		NA	NA	NA	NA	NA	NA	NA	NA	NA	Additional borings
282	Underground Storage Tank	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
283	Underground Storage Tank	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
286	Underground Storage Tank		X		X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
287	Underground Storage Tank	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
291	Oil/Water Separator	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
296	Oil/Water Separator	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
298	Underground Storage Tank			X		X		NA	NA	NA	NA	NA	NA	NA	NA	NA	Leak test/inspection of UST.
300	Spill Area East of SWMU/AOC 194			X	X				X		X				X		Further invest. under RI/FS program
301	Mark Arrest System		X		X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
302	Mark Arrest System	X			X			NA	NA	NA	NA	NA	NA	NA	NA	NA	No Further Action
303	Underground Storage Tank	X			X			X			X			X			No Further Action

MCAS EL TORO RCRA FACILITY ASSESSMENT -- SAMPLING VISIT RESULTS

SWMU/AOC NUMBER	SWMU/AOC TYPE (FIGURE)	BORING NUMBER	SAMPLE DEPTH (FEET)	TPH (mg/kg)	TFH (mg/kg) Gasoline	TFH (mg/kg) Diesel	VOCs (ug/kg)	SVOCs (ug/kg)	PESTICIDES/PCBs (ug/kg)	METALS (mg/kg)	RECOMMENDATIONS Action	RECOMMENDATIONS Rationale
272	Hazardous Waste Storage Area (17)	A1	10	ND	0.535	ND	Methylene Chloride-78 B * Acetone-36 B * 2-Butanone-3 J	ND	ND	Aluminum-26300	NFA	TPH/TFH < 100 ppm VOCs < CRDL SVOCs < CRDL Pest/PCB < CRDL Metals < ETM & PRG CRDL - Contract Required Detection Limit
			20	79	0.225	ND	Methylene Chloride-100 B * Acetone-32 B * 2-Butanone-4 J	ND	ND	Aluminum-16100		
			30	ND	0.067	ND	Methylene Chloride-75 B * Acetone-32 B * 2-Butanone-2 J	ND	ND	Aluminum-3640		
			40	ND	ND	ND	Methylene Chloride-44 B * Acetone-45 B *	ND	ND	Aluminum-19400		
			50	ND	ND	ND	Methylene Chloride-6 BJ * Acetone-14 B * 2-Butanone-3 BJ *	ND	ND	Aluminum-13500		
			60	ND	ND	ND	Methylene Chloride-5 BJ * Acetone-12 B * 2-Butanone-2 BJ *	ND	ND	Aluminum-16200		

PROJECT NUMBER	BORING NUMBER	
LA070022.SG.10	272A-1	SHEET 1 OF 2

SOIL BORING LOG

PROJECT NAVY CLEAN RCRA FACILITY ASSESSMENT LOCATION MCAS-EL TORO

ELEVATION ______ DRILLING CONTRACTOR BEYLIK DRILLING, INC., LA HABRA, CALIFORNIA

DRILLING METHOD AND EQUIPMENT HSA, 3-1/4" ID, 6-1/2" OD, INGERSOL-RAND TH-10

WATER LEVELS ______ START 10/29/92 FINISH 10/29/92 LOGGER A. GIMURTU

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL	TYPE AND NUMBER	RECOVERY (FT)	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY SOIL STRUCTURE MINERALOGY	DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS TESTS AND INSTRUMENTATION
						Start drilling at 12:30
5.0						
10.0	10.0 – 12.0	1-MC	2.0	29-42-49-60	LEAN CLAY WITH SAND (CL) dark brown moist, hard fine sand, trace to little silt trace 1 mm diameter white grains.	Sample headspace 8.5 ppm in sample sleeve at 11.0 feet with OVA.
15.0						
20.0	20.0 – 22.0	2-MC	1.8	12-15-36-30	Similar to 1-MC, no white grains	Sample headspace 50.0 ppm in sample sleeve at 21.0 feet with OVA.
25.0						
30.0	30.0 – 32.0	3-MC	2.0	13-25-50-60	SANDY SILT (ML), brown moist hard coarse to fine sand	Sample headspace 0 ppm at 31.0 feet with OVA
	32.0 – 34.0	3A-MC	1.4	30-40-40-40	Similar to 3-MC.	

CH2M HILL

PROJECT NUMBER	BORING NUMBER	
LA070022.S0.10	272A-1	SHEET 2 OF 2

SOIL BORING LOG

PROJECT NAVY CLEAN RCRA FACILITY ASSESSMENT LOCATION MCAS-EL TORO

ELEVATION ______ DRILLING CONTRACTOR BEYLIK DRILLING, INC., LA HABRA, CALIFORNIA

DRILLING METHOD AND EQUIPMENT HSA, 3-1/4" ID, 6-1/2" OD, INGERSOL-RAND TH-10

WATER LEVELS ______ START 10/29/92 FINISH 10/29/92 LOGGER A. GIMURTU

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
40.0	40.0–42.0	4-MC	2.0	10-20-55-60	SILTY SAND (SM), light brown, moist, very dense, fine grained.	Sample headspace 0 ppm at 41.0 feet with OVA
45.0						
50.0	50.0–52.0	5-MC	2.0	27-40-45-60	Similar to 4-MC.	Sample headspace 0 ppm at 51.0 feet with OVA
55.0						
60.0	60.0–62.0	6-MC		30-47-75-75/5"	SILTY SAND (SM), reddish-brown, moist, very dense, fine grained	Sample headspace 0 ppm at 61.0 feet
					Total Depth at 62.0 Feet	
65.0						

Table 6-15
Recommendations for SWMUs/AOCs
MCAS El Toro RFA

SWMU No.	SWMU/AOC Type	Recommendation (FA/NFA)	Description of Further Action	Rationale for Further Action
271	Hazardous Waste Storage Area	NFA	--	--
272	Hazardous Waste Storage Area	NFA	--	--
273	Wash Rack	NFA	--	--
275	Underground Storage Tank	NFA	--	--
276	Underground Storage Tank	NFA	--	--
277	Underground Storage Tank	NFA	--	--
278	Underground Storage Tank	NFA	--	--
279	Underground Storage Tank	NFA	--	--
280	Underground Storage Tank	FA	Additional boring(s)	Petroleum hydrocarbon contamination, unknown extent
282	Underground Storage Tank	NFA	--	--
283	Underground Storage Tank	NFA	--	--
286	Underground Storage Tank	NFA	--	--
287	Underground Storage Tank	NFA	--	--
291	Oil/Water Separator	NFA	--	--
296	Oil/Water Separator	NFA	--	--
298	Underground Storage Tank	FA	Leak test/inspection of UST	Petroleum contamination at 10 and 20-foot depths
300	Spill Area	FA	Additional boring(s)	Petroleum hydrocarbon contamination, unknown extent
301	Mark Arrest System	NFA	--	--
302	Mark Arrest System	NFA	--	--
303	Underground Storage Tank	NFA	--	--

FA - Further action
NFA - No further action

APPENDIX G
BNI VSI EVALUATION REPORT

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Room 135
San Diego, CA 92132-5187

Contract No. N68711-92-D-4670

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

FINAL ADDENDUM TO THE RCRA FACILITY ASSESSMENT MCAS EL TORO, CALIFORNIA (VOLUME 6 OF THE FINAL RFA REPORT)

CTO-0065/0170

May 1996

Prepared by:

BECHTEL NATIONAL, INC.
401 West A Street, Suite 1000
San Diego, CA 92101

Signature: Jacques P Lord

Jacques Lord, CTO Leader

Date: 31 May 1996

ACCUMULATION AREA EVALUATION CHECKLIST

(CIRCLE AS APPROPRIATE AND FILL IN COMPLETELY)

JOB 22214 CTO-0065
NAVY CLEAN II MCAS EL TORO RFA CONFIRMATION ACTIVITIES

GENERAL DESCRIPTION:

SWMU #: 272 Accumulation Area (AA) #: 31A
Location (bldg): HWSA/Bldg. 31
Site Contact: Cpl. Short Ext: 2836
Permission for Access? ~~Y~~ N If yes, explain: N/A.
Type of Wastes Observed None

TYPE: (CIRCLE AS APPROPRIATE)

~~Locker~~ ~~Cabinet~~ Pad Concrete/~~Soil/Asphalt~~ floor
Berm ~~Fence~~ ~~Fence Type:~~ ~~Indoor~~
Pallets Drum(s) No. of Drums: 7 Outdoor

CONDITION:

~~Stain(s)~~ ~~Odor(s)~~ ~~Crack(s)~~
Placards/Labels: Y ~~N~~ If Yes, list: Used Oil
Chlorine
Rags with fuel and oil.

Observations: Concrete pad and berm with roof. Sump and concrete surface is clean.
Status: No change, active as of 11/10/95

DIMENSIONS: (ESTIMATED SIZE OR AREA IN FT)

AA/SWMU: 10x20 ft.
"Stain(s)" : None.
Any Restrictions To Access?: posts and roof.

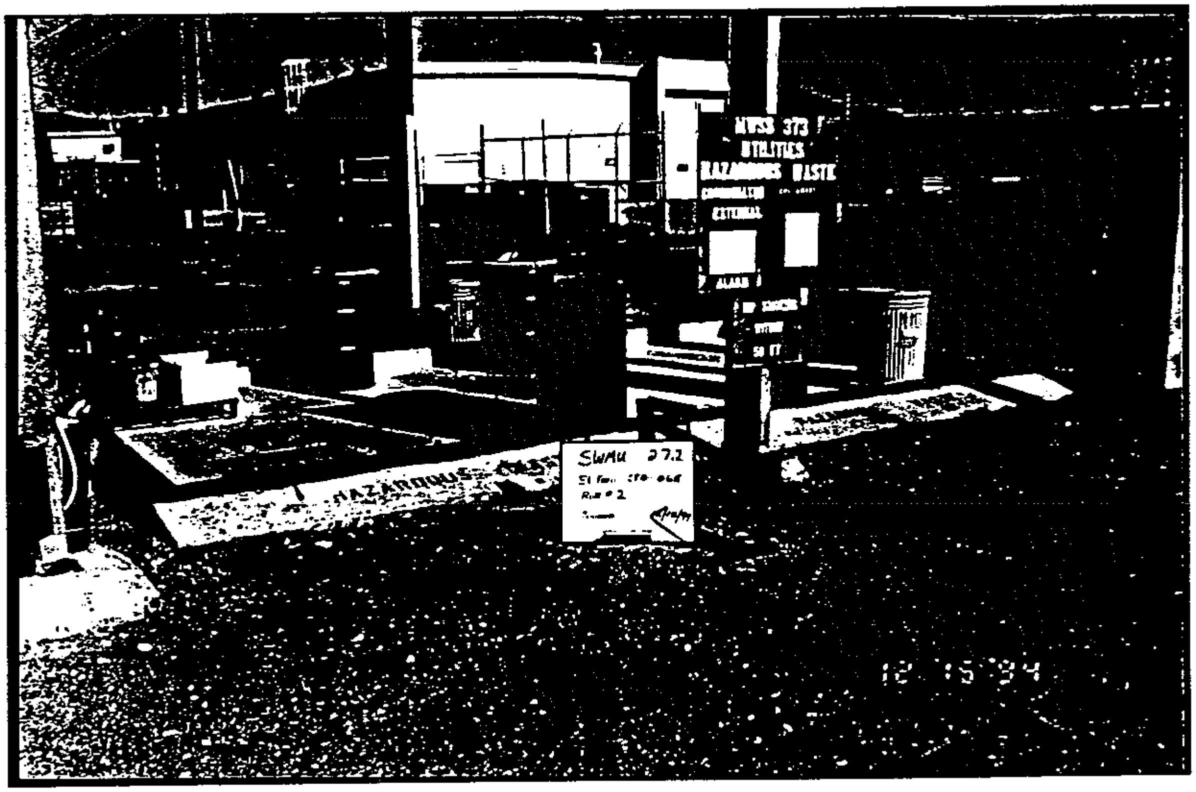
EVALUATION OF REMOVAL/DECONTAMINATION STRATEGY (CIRCLE AS APPROPRIATE)

Yes No Potential for release evident based on this surveillance
Yes No Potential for simple removal
Yes No Potential for decontamination activities prior to removal
Yes No Potential for sampling (describe:)
Yes No Potential for removal after additional assessment activities

SKETCH: (MAKE A SKETCH or ATTACH PHOTO(S) OF RELEVANT ACCESS, OBJECTS, WORK SPACE, ETC., AS APPROPRIATE, ON REVERSE OF THIS FORM)

DATE/TIME OF SURVEILLANCE: 12/6/94/9:35
UPDATED: 11/10/95/10:50
SURVEILLANCE PERFORMED BY: Larry Bauman

PHOTO LOG



SWMU #: 272

PHOTO DATE: 12-14-94

APPENDIX H
COPY OF CERCLA PETROLEUM EXCLUSION LETTER

Petroleum Exclusion

Based on the petroleum exclusion under CERCLA, the units listed below are excluded from the installation and Restoration Program. They will be addressed as petroleum release sites with the California Regional Water Quality Control Board as the lead regulatory agency.

Site 15 Suspended Fuel Tanks	Unit 1: Stained Areas
Site 19 ACER Site	Unit 1: Northeast Stained Area

The undersigned agree with the above statement:

10/25/95
Bonnie Arthur
U.S. Environmental Protection Agency Region IX

Joseph Joyce 10/25/95
Joseph Joyce
BRAC Environmental Coordinator

Juan Jimenez
California EPA, Dept. of Toxic Substances Control

Larry Vitale
Larry Vitale
California Regional Water Quality Control Board

APPENDIX I
COPY OF DRAFT FINAL PHASE II RI REPORT FOR OU 3A-SITE 15

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Room 135
San Diego, California 92132-5187

Contract No. N68711-92-D-4670

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

DRAFT FINAL PHASE II
REMEDIAL INVESTIGATION REPORT
ATTACHMENT I
OU-3A SITE 15, SUSPENDED FUEL TANKS
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

CTO-0079/0364

March 1997

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ACRONYMS/ABBREVIATIONS

AOC	area of concern
BCT	Base Realignment and Closure (BRAC) Cleanup Team
bgs	below ground surface
Cal-EPA	California Environmental Protection Agency
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	(U.S. EPA) Contract Laboratory Program
COPC	chemical of potential concern
CSF	cancer slope factor
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DQO	data quality objective
FCN	field change notice
FS	Feasibility Study
IRP	Installation Restoration Program
K_d	distribution coefficient
K_{oc}	organic carbon-to-water partitioning coefficient
MCAS	Marine Corps Air Station
µg/kg	micrograms per kilogram
µg/dL	micrograms per deciliter
mg/kg	milligrams per kilogram
OU	operable unit
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PRG	preliminary remediation goal
RFA	Resource Conservation and Recovery Act (RCRA) Facility Assessment
RfD	reference dose
RI	Remedial Investigation

ACRONYMS/ABBREVIATIONS (continued)

SAIC	Science Applications International Corporation
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TAL	target analyte list
TIC	tentatively identified compound
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
UCL	upper confidence limit
U.S. EPA	United States Environmental Protection Agency
VOC	volatile organic compound

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Section 1
INTRODUCTION

This attachment presents the results of the Remedial Investigation (RI) performed for Marine Corps Air Station (MCAS) El Toro, Site 15, Suspended Fuel Tanks. The discussion includes site-specific RI information, laboratory analytical results, and conclusions and recommendations. General RI information pertaining to all of the sites investigated under operable unit (OU)-3A is presented in the main body of this report.

The following information is included in this attachment:

- summary of the purpose and objectives of the RI, a general description and history of the site, and a summary of previous investigations (Section 1);
- ~~brief summary of the Phase I work performed and~~ a detailed description of the Phase II fieldwork (Section 2);
- description of the physical characteristics of the site (Section 3);
- discussion of nature and extent of contamination, using~~including~~ Phase II data (Section 4);
- fate-and-transport analysis for the site (Section 5);
- baseline human-health risk analysis based on Phase II data (Section 6);
- summary, conclusions, and a list of recommended actions (Section 7); and
- list of references (Section 8).

1.1 INVESTIGATION OBJECTIVES

The following are the primary conditions, defined by the interpretation of data from previous investigations, that have driven the work performed under the Phase II investigation.

- The nature of the historical equipment maintenance activities conducted at Site 15, Unit 2 suggested that shallow soil may be contaminated with total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAHs), pesticides and polychlorinated biphenyls (PCBs) and, possibly, metals.
- Unit 1 was investigated under the Phase I RI and was found to contain petroleum hydrocarbons. This unit was removed from the Phase II investigation based on a petroleum exclusion. Unit 1 is no longer included in Site 15.
- Phase II sampling was intended to address the area behind Building 31 (Unit 2), including the concrete pad and drainage path. This area was not investigated during the Phase I RI. The Phase II data set will be used to estimate the excess lifetime cancer risk and perform the hazard index (HI) assessment for Site 15, Unit 2.

Data quality objectives (DQOs) for the Phase II RI were developed to address these conditions. The objectives are presented in Section 4 of the final Work Plan Phase II RI/Feasibility Study (FS) (BNI 1995a) Site-specific DQO decisions were also developed for Site 15, Unit 2, and are presented in Appendix O of the Work Plan. Phase II RI sampling was planned to provide the data necessary to respond to the following DQO decisions.

- Do chemicals in shallow soil (less than 10 feet below ground surface [bgs]) at the site exceed established background concentrations and preliminary remediation goals (PRGs) (BNI 1995a), and/or do they present an unacceptable risk to human health or the environment?
- Has the extent of impacted soil been defined for the shallow-soil interval?
- Does the impacted soil extend greater than 10 feet bgs?
- Do the media being evaluated for a response action qualify for early action?

Table 1-1 summarizes the site objectives, data types, and data uses for the scope of work at Site 15, Unit 2.

1.2 SITE BACKGROUND

This section provides a general description of Site 15 and summarizes the site history.

1.2.1 Site Description

Site 15 is part of a fenced storage yard located in the northwest quadrant of MCAS El Toro, behind Building 31 and north of West Marine Way (Figure 1-1). The site is relatively flat and at an elevation of approximately 260 feet above mean sea level. Half of the site is covered by a concrete pad and metal aircraft matting; the remainder is bare soil. A narrow (about 2 feet wide), shallow drainage ditch extends from the concrete pad southwest toward the perimeter fence along West Marine Way.

The site comprises two distinct areas. The first area is the location of two former aboveground diesel fuel tanks. The second is an equipment wash rack and storage area immediately behind Building 31 (Figure 1-2). The area encompassing the two former aboveground fuel tanks was investigated during the Phase I RI. The site boundaries for the Phase I RI were determined by consensus among the Navy and the state and federal regulatory agencies prior to initiation of the investigation. This area was not addressed during the Phase II RI because it was removed from the Navy Installation Restoration Program (IRP) by the Base Realignment and Closure (BRAC) Cleanup Team (BCT) based on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) exclusion for petroleum. The equipment washing and storage area behind Building 31 was identified prior to the Phase II field activities and was the only part of Site 15 investigated during the Phase II RI. In August 1996, the Draft MCAS El Toro Community Reuse Plan was issued. According to this plan, Site 15 is located within an area designated for parking.

Table 1-1
OU[a]-3A Site Objectives, Data Types, and Data Uses

REMEDIAL INVESTIGATION REPORT					
DQO[b] Decisions (Section 1)	Data to be Collected (Section 2)	Physical Characteristics (Section 3)	Nature and Extent (Section 4)	Fate and Transport (Section 5)	Human-Health Risk Assessment (Section 6)
1. Assess whether COPCs[c] in shallow soil exceed screening levels (background and PRGs[d]) and/or present unacceptable risk.	Soil samples – Hand auger – Direct push	NA[e]	Compare concentrations of analytes in shallow soil with background concentrations and PRGs.	Prepare site conceptual model.	Evaluate risk under industrial and residential land use scenarios
2. Determine the extent of contamination in shallow soil (< 10 feet bgs[f]).	Soil samples – Hand auger – Direct push – Hollow-stem auger borings	Surface features – Topography – Surface gradients Meteorology – Climatological information Soil properties – Grain-size analyses of soil and sediment	Determine type and distribution of analytes in shallow soil.	Prepare site conceptual model.	Evaluate risk under industrial and residential land use scenarios.
3a Determine if extent of contamination extends into deeper subsurface soil (> 10 feet bgs).	Soil samples – Dual-tube percussion borings – Direct push – Hollow-stem auger borings	Surface features – Topography – Surface gradients Meteorology – Wind speed and direction – Rainfall Soil properties – Grain-size distribution – Moisture – Site geology	Determine type and distribution of analytes in deeper subsurface soil.	Prepare site conceptual model.	NA
3b Determine if soil contamination extends to groundwater.	Groundwater samples – HydroPunch® – Monitoring wells	Hydrogeology – Depth to groundwater – Direction of groundwater flow	Determine type and distribution of analytes in groundwater.	Prepare site conceptual model	Evaluate risk from groundwater during residential uses.
4. Determine if site qualifies for Early Action.	Soil samples – Hand auger – Direct push – Hollow-stem auger borings	Surface Features – Topography – Surface gradients Meteorology – Wind speed and direction – Rainfall	Determine type, concentration, and distribution of analytes in all media.	Assess potential for off-site migration of contaminants.	Evaluate whether contaminants at site pose an imminent risk to human health or the environment

Notes:
[a] OU – operable unit
[b] DQO – data quality objective
[c] COPC – chemical of potential concern
[d] PRG – preliminary remediation goal
[e] NA – not applicable
[f] bgs – below ground surface

1.2.2 History

Site 15 is located within the storage yard of Building 31, which is a maintenance and utilities shop for Wing Engineering Squadron 37. Historically, the storage yard was used for storage and maintenance of military vehicles and equipment, including cranes, tractors, front-end loaders, bulldozers, power generators, and refrigeration equipment.

From 1979 to 1984, two 500-gallon aboveground storage tanks containing diesel fuel were located near the entrance gate to Site 15 just north of Building 31. During this time period, an estimated 500 gallons of diesel fuel spilled onto the bare ground from the fueling nozzles and hoses. The tanks were removed in 1984 (Jacobs Engineering 1993a).

Ongoing operations in the area behind Building 31 (Figure 1-2) include equipment maintenance and cleaning on the concrete pad as well as equipment storage in adjacent areas. Wastes generated from on-site operations include waste oil, waste motor fuel, empty paint cans, and paint thinner. Past site operations generated approximately three 55-gallon drums of waste material per month. Phase II RI activities were initiated to investigate the potential release of chemical wastes from washdown of the concrete pad and disposal of waste liquids in the area behind Building 31 (BNI 1995a).

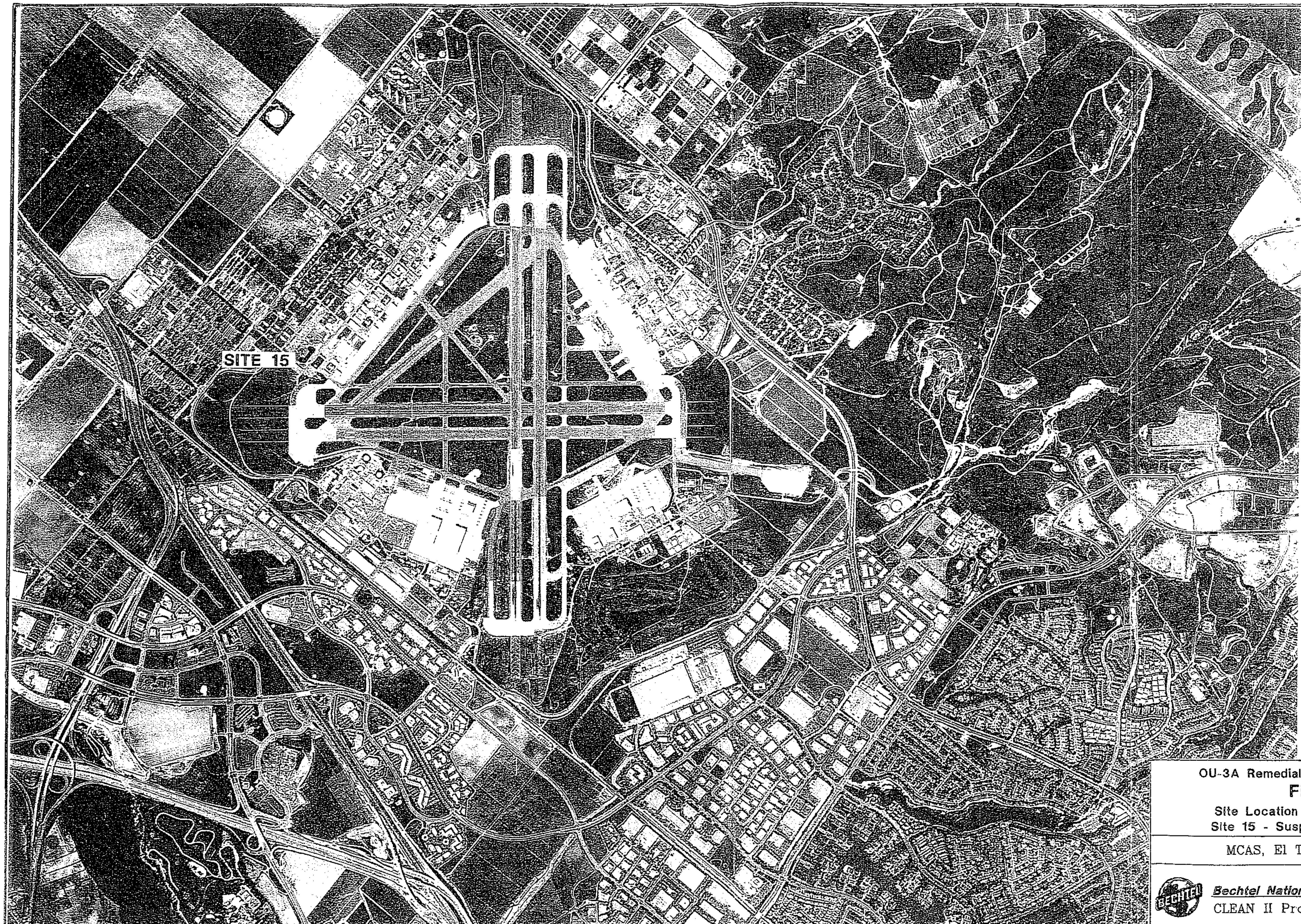
1.3 PREVIOUS INVESTIGATIONS

Several investigations have been conducted in the area of Site 15. These include the Resource Conservation and Recovery Act (RCRA) Facilities Assessment (RFA), the Phase I RI, and the United States Environmental Protection Agency (U.S. EPA) and Science Applications International Corporation (SAIC) aerial photographic surveys. These investigations provided data used to develop the Phase II scope of work. The sections below provide a brief summary of the previous investigations.

1.3.1 RCRA Facilities Assessment

The RFA identified solid waste management units (SWMUs)/areas of concern (AOCs) 272 and 273 within Site 15 boundaries. SWMU/AOC 272 is a hazardous waste storage area and is located about 40 feet northwest of Building 31. It consists of a bermed concrete pad covered by an open-air shelter. No staining was observed on the concrete pad or the ground surface around the pad during the RFA. During the investigation, the following activities took place.

- One deep boring was advanced to a depth of 60 feet bgs.
- Samples were collected at 10, 20, 30, 40, 50, and 60 feet bgs.
- Soil samples were analyzed for target analyte list (TAL) metals, total recoverable petroleum hydrocarbons (TRPH), TPH, and volatile organic compounds (VOCs).
- Low concentrations of VOCs, TPH, and TRPH were reported in samples to a depth of 30 feet bgs (Jacobs Engineering 1993b).



OU-3A Remedial Investigation Report

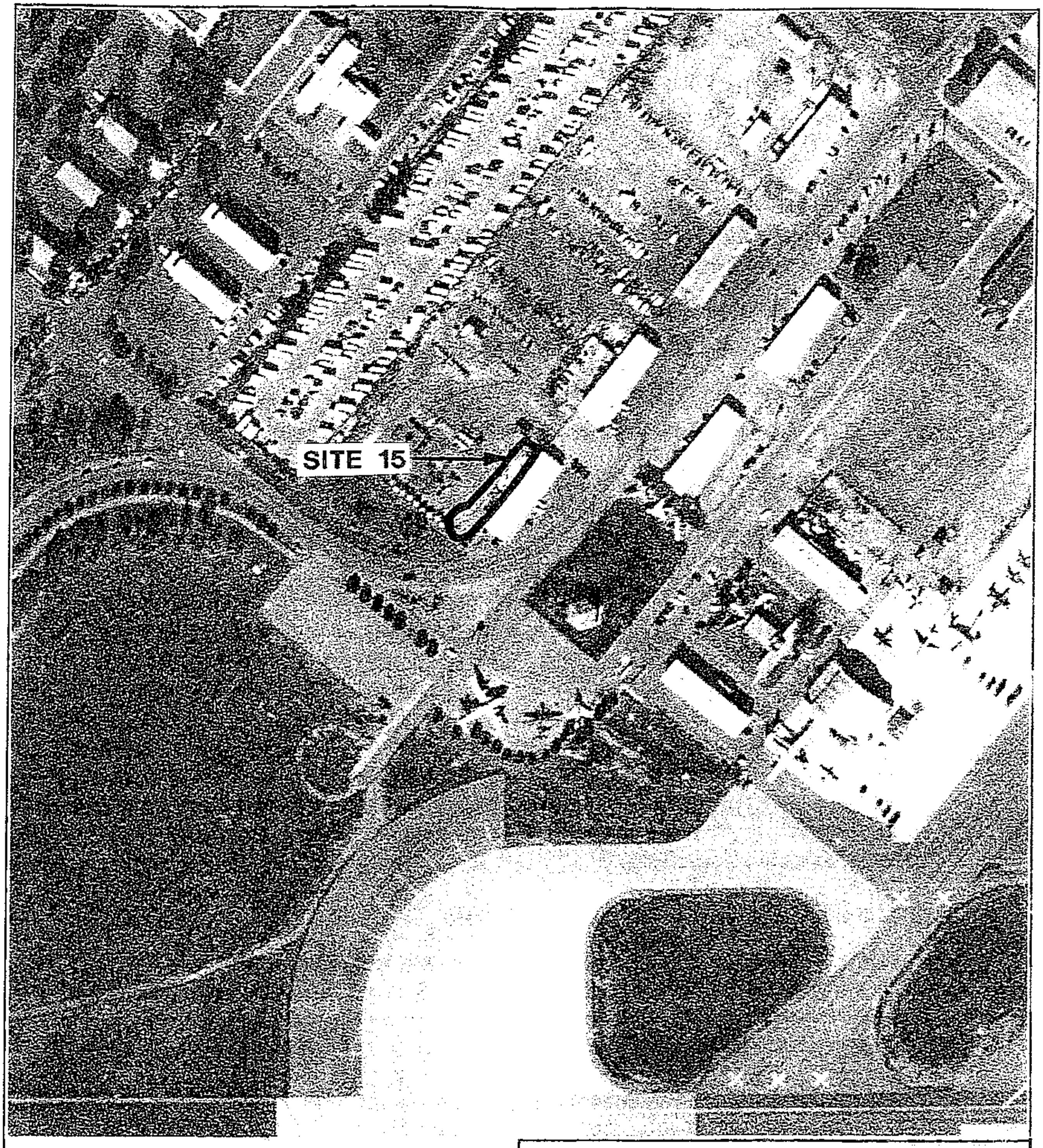
Figure 1-1

Site Location Aerial Photograph
Site 15 - Suspended Fuel Tanks

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 9/27/96
File No: -
Job No: 22214-079
Rev No: A



NORTH

TRUE

-N-

SOURCE: AERIAL PHOTOBANK INC
SAN DIEGO, CALIFORNIA
DATE: 1/12/96

OU-3A Remedial Investigation Report

Figure 1-2

Site Aerial Photograph (1/12/96)
Site 15 - Suspended Fuel Tanks

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 11/5/96
File No:
Job No: 22214-079
Rev No: A

SWMU/AOC 273 includes the concrete pad and drainage area located adjacent to Building 31 (Unit 2) The concrete pad abuts Building 31. No cracks or significant stains were observed on the concrete pad surface The drainage path is a shallow, narrow, ditch cut in bare soil that originates at the southwest corner of the concrete pad and leads southwest to the edge of the storage yard.

The following activities took place during the investigation of SWMU/AOC 273.

- Three borings were advanced in the drainage path area.
- Soil samples were collected at 2 and 5 feet bgs
- Soil samples were analyzed for TRPH and VOCs.

TRPH compounds were not reported in any of the soil samples collected; low concentrations of VOCs were reported in all soil samples, but none were reported at levels above assigned risk-based concentrations (Jacobs Engineering 1993b).

1.3.2 Phase I Remedial Investigation

The Phase I RI soil sampling activities at Site 15 focused exclusively on the locations of the former aboveground diesel fuel tanks. This area was eliminated from Phase II RI activities because of a CERCLA petroleum exclusion. A groundwater sample was also collected from a monitoring well at the location of the former aboveground diesel fuel tanks Analytes reported in groundwater included VOCs, petroleum hydrocarbons, metals, and general chemistry parameters. The source of the VOCs and petroleum hydrocarbons appears to be Tank Farm 2, located upgradient of Site 15. Therefore, the results of the Phase I soil and groundwater investigations will not be discussed further in this attachment.

1.3.3 U.S. EPA Aerial Photograph Survey

In a 1991 photograph, Site 15 appeared to be an open storage area. Pooled liquid and stained soil were observed in the approximate area of the former suspended fuel tanks (Jacobs Engineering 1993a). The 1991 photograph was taken after the aboveground fuel tanks were removed.

1.3.4 SAIC Aerial Photograph Survey

The SAIC aerial photograph survey identified an extensive open storage area west of Buildings 29 and 31 in a 1946 photograph. Also, in a 1974 photograph, stains were visible approximately 100 feet southwest of Building 31. No other site-related features were identified by the SAIC photo assessment (SAIC 1993).

1.3.5 Employee Interviews

Employee interviews conducted for MCAS El Toro did not identify any activities/ operations pertaining to Site 15 (Jacobs Engineering 1994a).

Section 2
STUDY AREA INVESTIGATIONS

This section describes the investigation activities completed for the Phase II RI at Site 15, Unit 2 The Phase II investigation activities were planned and implemented in accordance with the final Work Plan (BNI 1995a), the final Field Sampling Plan Phase II RI/FS (BNI 1995b), and CLEAN II program procedures and include the following

- Results of aerial photograph surveys were reviewed to locate possible areas of soil contamination.
- Soil sampling was performed to determine the nature and extent of contaminants and provide data to support the baseline human-health risk assessment at Site 15, Unit 2.

Results of the Phase II RI are presented in Section 4.

Throughout the Phase II RI, weekly meetings were held with the BCT. Deviations from planned sampling activities or methods were discussed and approved by the BCT. Procedural changes were documented using field change notices (FCNs). FCNs documented for the Phase II sampling activities are addressed in Section 2 of the main body of this report. Table 2-1 summarizes site-specific BCT decisions.

Table 2-1
BCT[a] Meeting Decisions Specific to the Site 15 Phase II Investigation

Description	Action	Date
Unit 1 excluded from the IRP[b].	The BCT agreed to exclude Unit 1 of Site 15 from the IRP based on the petroleum exclusion under the Comprehensive Environmental Response, Compensation, and Liability Act.	26 October 1995
Presented results of Tier 1 soil sampling and recommendations for Tier 2 sampling locations.	The BCT approved the recommended Tier 2 locations	25 May 1996
Results of Tier 2 sampling suggested no additional investigation was required at Unit 2.	The BCT agreed that the lateral and vertical extent of contaminants had been defined. Phase II sampling at Site 15 is complete.	17 July 1996

Notes:
[a] BCT – Base Realignment and Closure (BRAC) Cleanup Team (BCT)
[b] IRP – Installation Restoration Program

2.1 AERIAL PHOTOGRAPH REVIEW

Results of two aerial photograph surveys were reviewed to identify possible areas of contamination. Current and historical photographs helped determine how land use at Site 15 varied over time.

2.2 SOIL SAMPLING

Phase II sampling followed a tiered approach In accordance with the Work Plan, Tier 2 samples were considered whenever field screening or laboratory analyses showed the concentration of an analyte exceeded its respective PRG or background levels (for metals). Decisions regarding Tier 2 sampling were approved by the BCT (Table 2-1). Figure 2-1 presents a site plan showing sample locations for Site 15, Unit 2. Table 2-2 summarizes the Phase II sample locations and depths.

Phase II Tier 1 RI soil sampling activities at Site 15 took place on 26, 29, and 30 January 1996. Nineteen Tier 1 soil samples were collected at six locations in Unit 2 (Figure 2-1). Soil samples were collected from three intervals: 0 to 1 (0.5 to 1.5 feet bgs at boring 15B202, which was under a concrete pad), 3 to 5, and 8 to 10 feet bgs at each location. Soil samples were collected using a manual-drive sampler for the 0- to 1-foot-bgs sample interval and a direct-push, continuous-sample, truck-mounted rig for the intervals from 3 to 5 and 8 to 10 feet bgs. One additional sample was collected from soil boring location 15B201 at a depth of 5 to 6.5 feet bgs. Sampling locations were selected using an areal systematic-random-sampling approach. A detailed discussion of sample number determinations and location selection methodology is provided in Section 4 and Appendix I of the Work Plan and in the summary discussion in Section 2 of the main body of this document.

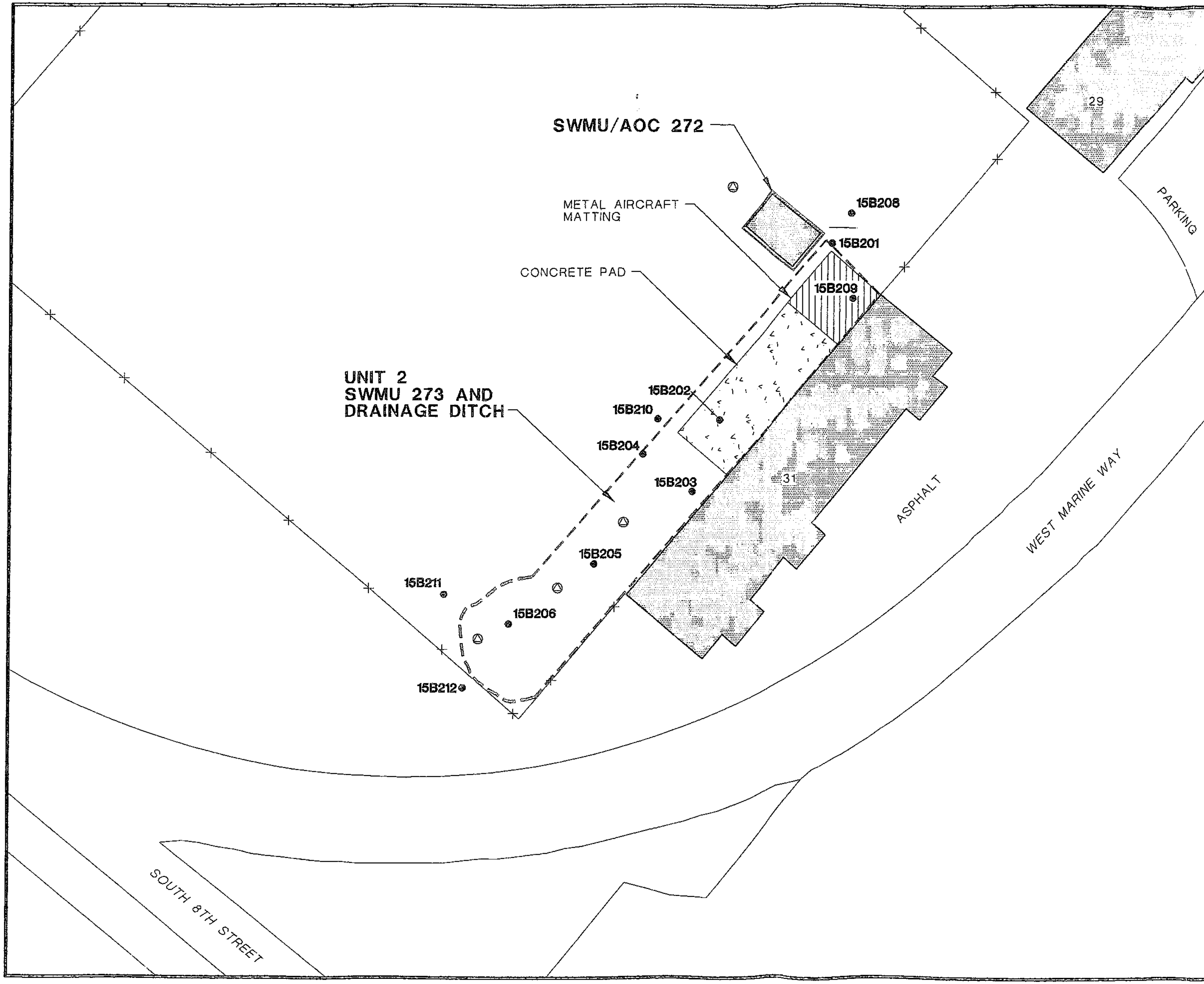
Unit 2, Tier 2 soil sampling activities took place on 01 April 1996 and 05 June 1996 Fifteen Tier 2 soil samples were collected at five locations in Site 15, Unit 2 (Figure 2-1). Tier 2 soil samples were collected from three intervals: 0 to 0.5, 4.5 to 5, and 9.5 to 10 feet bgs at each location. Surface-soil samples were collected at each location using a manual-drive sampler for the 0- to 1-foot-bgs sample interval. Shallow-soil samples (1 to 10 feet bgs) from borings 15B208 and 15B209 were collected using a direct-push, continuous-sample, truck-mounted rig. Shallow-soil samples for borings 15B210, 15B211, and 15B212 were collected using a hollow-stem auger rig.

2.3 FIELD-SCREENING AND LABORATORY ANALYSES

Table 2-3 presents the field-screening and fixed-base laboratory analyses performed on the Phase II soil samples. Phase II analyses were based on:

- site activities and history;
- results of previous investigations; and
- objectives of the site-specific RI/FS efforts.

The Phase II analyses are discussed below.



OU-3A Remedial Investigation Report

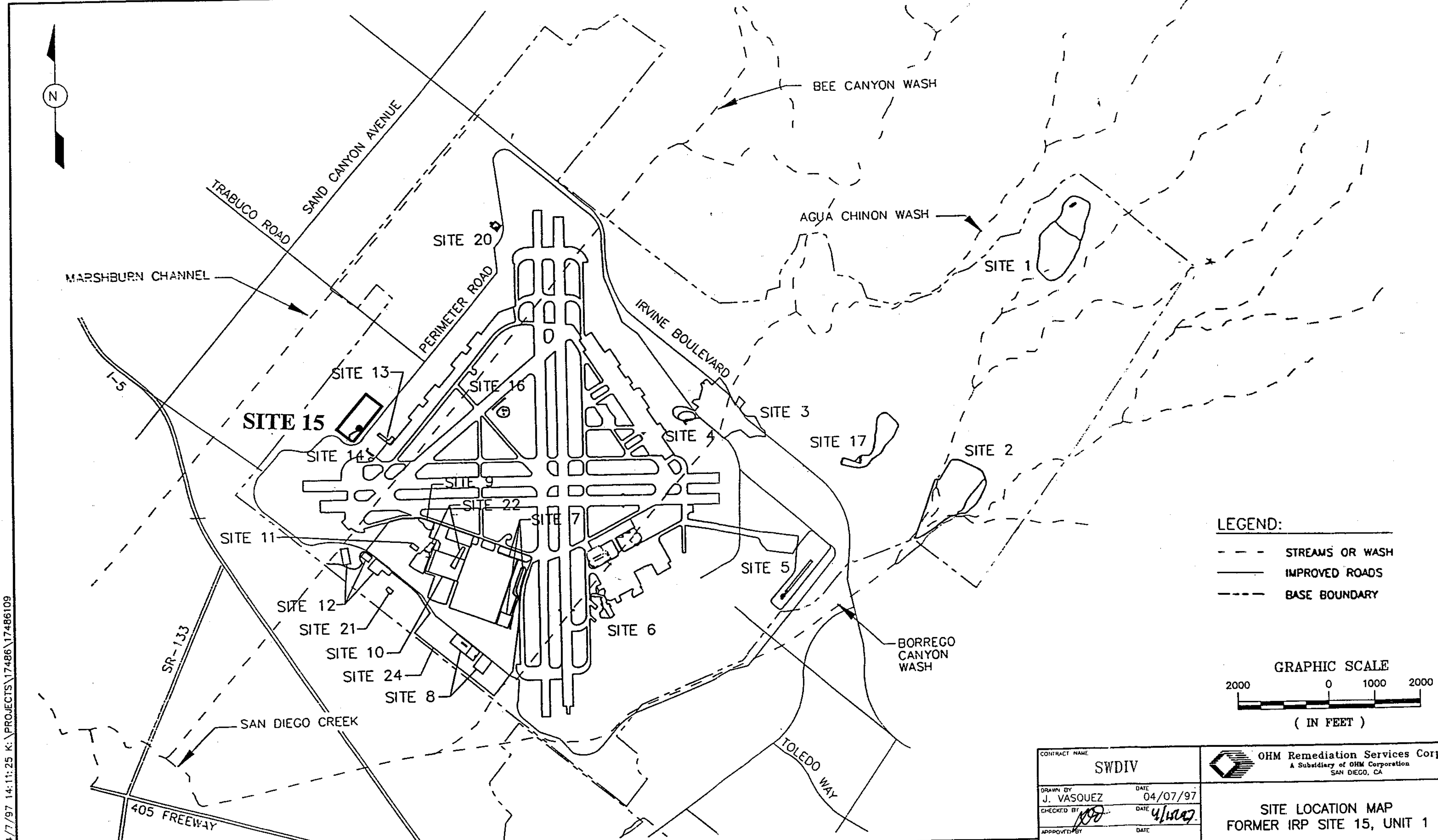
Figure 2-1

Phase II Sampling Locations
Site 15 - Suspended Fuel Tanks

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 11/5/96
File No: 079L1363
Job No: 22214-079
Rev No: C



REVISIONS			
REV. No.	DESCRIPTION	DATE	APPROVED

CONTRACT NAME: SWDIV

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation
SAN DIEGO, CA

DRAWN BY: J. VASQUEZ — DATE: 04/07/97
CHECKED BY: [signature] — DATE: 4/10/97
APPROVED BY: — DATE:
PROJECT MANAGER: — DATE:
AUTOCAD FILE No.: 17486109.DWG

SITE LOCATION MAP
FORMER IRP SITE 15, UNIT 1

MCAS
EL TORO, CALIFORNIA

SCALE	SHEET	OF	DOCUMENT CONTROL No.	OHM PROJECT No.	DRAWING No.
AS NOTED	1	1	SW3006	17486	FIG 2-2

RC 0:0:31:40 4/7/97 14:11:25 K:\PROJECTS\17486\17486109

Table 2-2
Summary of Site 15 Phase II Soil Borings

Unit	Soil Boring	PHASE II SAMPLE INTERVALS Tier 1[a] (feet bgs[b])	Tier 2[a] (feet bgs)
2	15B201	0 – 1, 3 – 5, 5 – 6.5, 8 – 10	
	15B202	0.5 – 1.5, 3 – 5, 8 – 10	
	15B203	0 – 1, 3 – 5, 8 – 10	
	15B204	0 – 1, 3 – 5, 8 – 10	
	15B205	0 – 1, 3 – 5, 8 – 10	
	15B206	0 – 1, 3 – 5, 8 – 10	
	15B208		0 – 0.5, 4.5 – 5, 9.5 – 10
	15B209		0 – 0.5, 4.5 – 5, 9.5 – 10
	15B210		0 – 0.5, 4.5 – 5, 9.5 – 10
	15B211		0 – 0.5, 4.5 – 5, 9.5 – 10
	15B212		0 – 0.5, 4.5 – 5, 9.5 – 10

Notes:
[a] Tier 1 and Tier 2 designation in accordance with final Work Plan for the Phase II Remedial Investigation/Feasibility Study
[b] bgs – below ground surface

Table 2-3
Analyses of Phase II Soil Samples

Analyte	UNIT 2 No. of Tier 1 Samples	No. of Tier 2 Samples	Analytical Method
Field Screening			
Polynuclear aromatic hydrocarbons	18	9	U.S. EPA[a] Method 4035
Total petroleum hydrocarbons	18	0	U.S. EPA modified Method 8015
Fixed-Base Analyses			
Polynuclear aromatic hydrocarbons	5	9	U.S. EPA Method 8310
Total petroleum hydrocarbons	5	0	U.S. EPA modified Method 8015
Pesticides/PCBs[b]	19	0	U.S. EPA Method 8080
Target analyte list metals	19	9	U.S. EPA CLP[c]
Hexavalent chromium	0	9	U.S. EPA Method 7196
Total Phase II Samples	19	15	

Notes:
[a] U.S. EPA – United States Environmental Protection Agency
[b] PCB – polychlorinated biphenyl
[c] CLP – (U.S. EPA) Contract Laboratory Program

2.3.1 Field Screening

Eighteen of the 19 Phase II Tier 1 shallow-soil samples were field-screened for PAHs (U.S. EPA Method 4035) using immunoassay test kits and for TPH (U.S. EPA modified Method 8015) using an appropriately equipped mobile laboratory. Nine Tier 2 soil samples were also field-screened for PAHs using the immunoassay test kits. No field-screening analyses were performed on samples collected from Tier 2 borings 15B208 and 15B209.

2.3.2 Fixed-Base Analytical Laboratories

All Phase II Tier 1 shallow-soil samples from borings 15B201 through 15B206 (19 samples) were analyzed at a fixed-base laboratory for pesticides/PCBs (U.S. EPA Method 8080), and TAL metals (U.S. EPA Method Contract Laboratory Program [CLP]).

Selected Phase II Tier 1 soil samples (5) were also submitted to the fixed-base laboratory to confirm field-screening results. These soil samples were analyzed for PAHs (U.S. EPA Method 8310) and TPH (U.S. EPA modified Method 8015).

All Phase II Tier 2 soil samples from borings 15B208, 15B209, and 15B210 (nine samples) were analyzed at a fixed-base laboratory for TAL metals (U.S. EPA CLP) and hexavalent chromium (U.S. EPA Method 7196). All Phase II Tier 2 soil samples from borings 15B210, 15B211, and 15B212 (nine samples) were analyzed for PAHs (U.S. EPA Method 8310).

Fixed-base laboratory analyses were performed in accordance with Level IV (formerly Naval Energy and Environmental Support Activity Level D) protocols.

Section 3

PHYSICAL CHARACTERISTICS OF THE SITE

This section describes the physical characteristics of Site 15 that were used for developing a site-specific conceptual model and potential contaminant pathways for the risk assessment. Stationwide physical characteristics are discussed in Section 3 of the main body of this report.

3.1 SURFACE FEATURES

Site 15 is located in the northwest quadrant of MCAS El Toro. The site is north and west of West Marine Way, behind Building 31. The terrain in the immediate area is relatively flat. Surface grades are approximately 0 to 3 percent. Figure 3-1 presents a topographic map of Site 15. The site surface is generally covered with dirt and gravel, except for the concrete pad and aircraft matting areas abutting Building 31. A shallow drainage ditch runs from the southwest corner of the concrete pad southwest toward the perimeter fence. Surface drainage from the site appears to flow from northeast to southwest and is controlled locally by the Unit 2 drainage ditch. Surface runoff in the ditch tends to pond at the south end of Unit 2.

3.2 SOILS

Based on a review of the Phase II RI boring logs (Appendix E), the shallow-soil lithology at Site 15 consists primarily of sand, silty sand, and silt. The grain sizes of the sand strata range from fine- to coarse-grained sand, and the silt strata range from clayey to sandy silt.

According to the soil survey of Orange County, performed by the U.S. Department of Agriculture Soil Conservation Service and Forest Service, soil in the area of Site 15 is classified as Sorrento loam. Sorrento loam develops on a nearly flat terrain derived from alluvial fan and floodplain deposits such as those present at Site 15. Where the soil is bare, like that at Site 15, the surface-water runoff is slow and erosion hazard is slight. Available water capacity is 10 to 13 inches (Wachtell 1978).

3.3 GEOLOGY

The geology of Site 15 consists of Quaternary alluvial and marine deposits (Jacobs Engineering 1993a). Holocene deposits consist of fine-grained overbank deposits and coarse-grained stream channel deposits. These soils are derived from the Santa Ana Mountains to the east and conformably overlie Pleistocene interbedded fine-grained lagoonal and near-shore marine deposits. Pleistocene deposits were not differentiated from Holocene deposits in Phase I or Phase II RI soil borings (Appendix E). Pleistocene deposits unconformably overlie semiconsolidated marine sandstones, siltstones, and conglomerates of late Miocene to late Pliocene, which are considered to be bedrock in the area.

3.4 HYDROGEOLOGY

MCAS El Toro is located within the Irvine Groundwater Subbasin, which is part of the Los Angeles Groundwater Basin. Regional aquifers in the Irvine Groundwater Subbasin are generally composed of discontinuous lenses of clayey and silty sands and fine-grained gravels contained within a complex assemblage of sandy clays and sandy silts. Two general aquifer systems have been identified near the station: a principal aquifer zone and a lower hydrogeologic system existing in bedrock (Jacobs Engineering 1993a).

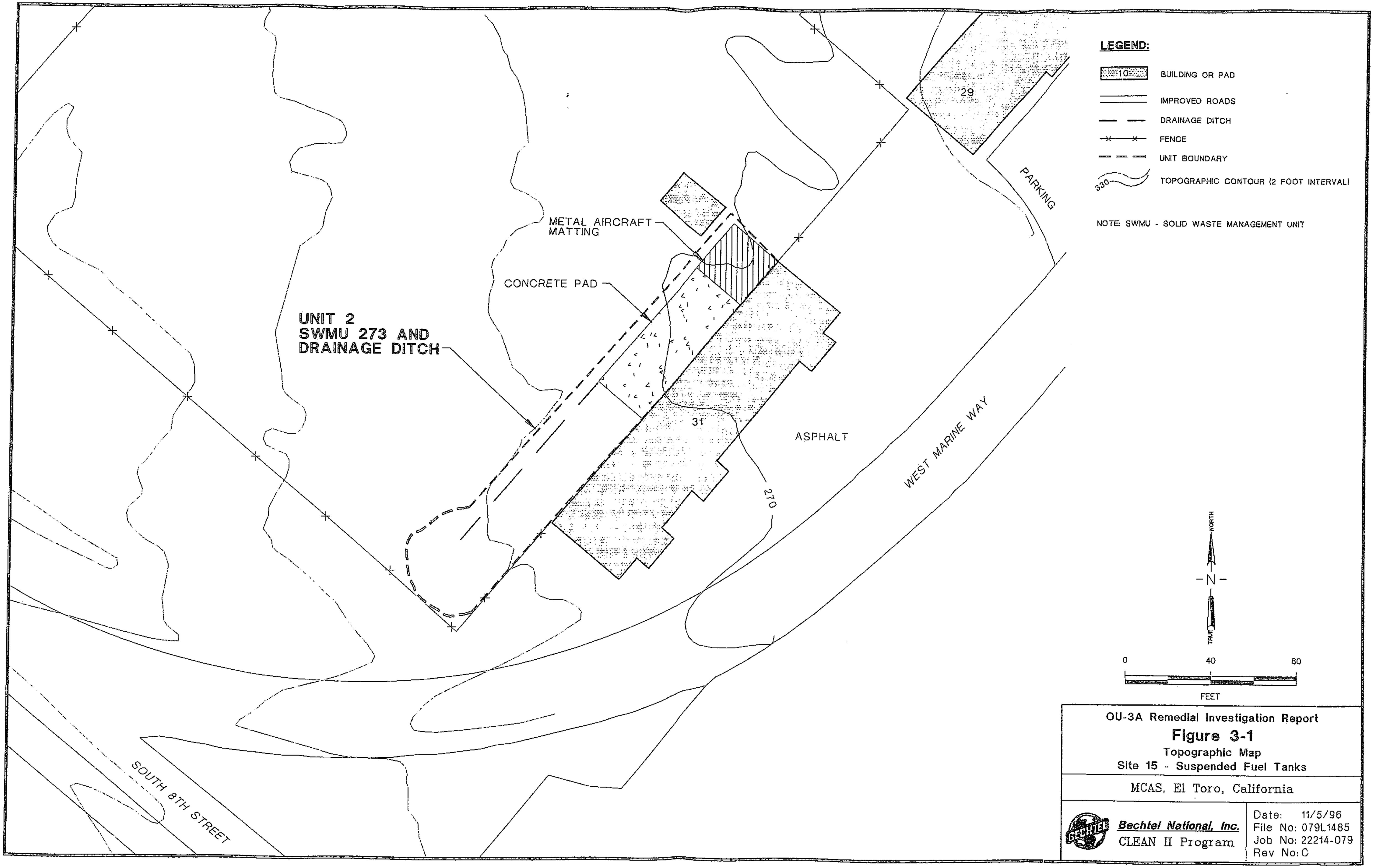
The principal aquifer is present beneath Site 15 at a depth of approximately 130 feet bgs. The regional groundwater flow direction is to the west-northwest. The local hydraulic gradient has been influenced strongly by the pumping of irrigation wells located west of MCAS El Toro.

3.5 CURRENT LAND USE

Site 15 remains active and comprises part of the support area for MCAS El Toro Wing Engineering Squadron 37. Building 31 is a utilities shop, and the remainder of the site is used for storage and maintenance of military vehicles and equipment. The vehicles and equipment include cranes, tractors, front-end loaders, bulldozers, power generators, and refrigeration equipment. The site is completely fenced with a gate that is typically locked

3.6 ECOLOGY

A habitat assessment was performed for the OU-3A sites in May 1995 The results of this assessment indicated an absence of significant plant and wildlife habitat at Site 15. Therefore, an ecological risk assessment was not performed as part of the Phase II RI/FS for Site 15. The specific results of the habitat assessment for the OU-3A sites are presented in Appendix L.



OU-3A Remedial Investigation Report

Figure 3-1

Topographic Map

Site 15 - Suspended Fuel Tanks

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 11/5/96
File No: 079L1485
Job No: 22214-079
Rev No: C

Section 4
NATURE AND EXTENT OF CONTAMINATION

This section discusses the reported concentrations and spatial distribution of contaminants at Site 15. Information presented in this section is derived from the Phase II RI sampling and analysis.

4.1 SUMMARY OF PHASE II SAMPLING RESULTS

During the Phase II RI, Tier 1 and Tier 2 soil samples were collected at 11 soil boring locations in Unit 2 (151B201 through 15B206, and 15B208 through 15B212 [see Figure 4-1]). A summary of the methodology follows.

- Soil samples were collected at depth intervals of 0 to 1, 3 to 5, 5 to 6.5, and 8 to 10 feet bgs from boring 15B201; 0.5 to 1.5, 3 to 5, and 8 to 10 feet bgs from boring 12B202; 0 to 1, 3 to 5, and 8 to 10 feet bgs from borings 15B203, 15B204, 15B205, and 15B206; and 0 to 0.5, 4 to 4.5, and 9.5 to 10 from borings 15B208, 15B209, 15B210, 15B211, and 15B212.
- Soil samples were analyzed in the field using immunoassay field kits to screen for PAH compounds, and soil samples were analyzed at a mobile laboratory for TPH. Three comparison ranges were established for evaluation of PAH results: less than 60 micrograms per kilogram (μg/kg), greater than 60 and less than 275 μg/kg, and greater than 275 μg/kg.
- Soil samples were analyzed by a fixed-base laboratory for PAHs, TPH, pesticides/PCBs, and TAL metals (Table 4-1).
- TAL metals analyzed during the Phase II RI were aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc.

Laboratory analytical results for shallow-soil samples (0 to 10 feet bgs) collected during Phase II reported:

- PAHs at concentrations less than 400 μg/kg from five of seven Phase II soil borings sampled for PAHs;
- motor oil at concentrations up to 530 milligrams per kilogram (mg/kg) from two of four Phase II soil borings sampled for TPH;
- pesticides at concentrations less than 230 μg/kg from each Phase II soil boring sampled for pesticides;
- PCBs at concentrations less than 50 μg/kg from one of six Phase II soil borings sampled for PCBs; and
- fourteen of 23 metals above their respective background levels; metals above background were reported in each Phase II soil boring sampled for metals.

4.2 NATURE AND EXTENT OF CONTAMINATION

This section evaluates the Phase II data and describes the concentration ranges and spatial distribution of analytes reported at Site 15 Unit 2. This information about analyte impacts on soil is needed for the fate-and-transport analysis (Section 5) and risk assessment (Section 6). Five TAL metals (calcium, iron, magnesium, potassium, and sodium) are considered essential nutrients and will not be discussed in this section or subsequent sections addressing fate and transport and risk.

Analytes reported in shallow soil at Site 15 Unit 2 include PAHs, TPH, pesticides/PCBs, and TAL metals. The distribution of these chemical groups is presented in Figure 4-2.

4.2.1 Unit 2: Field-Screening Results

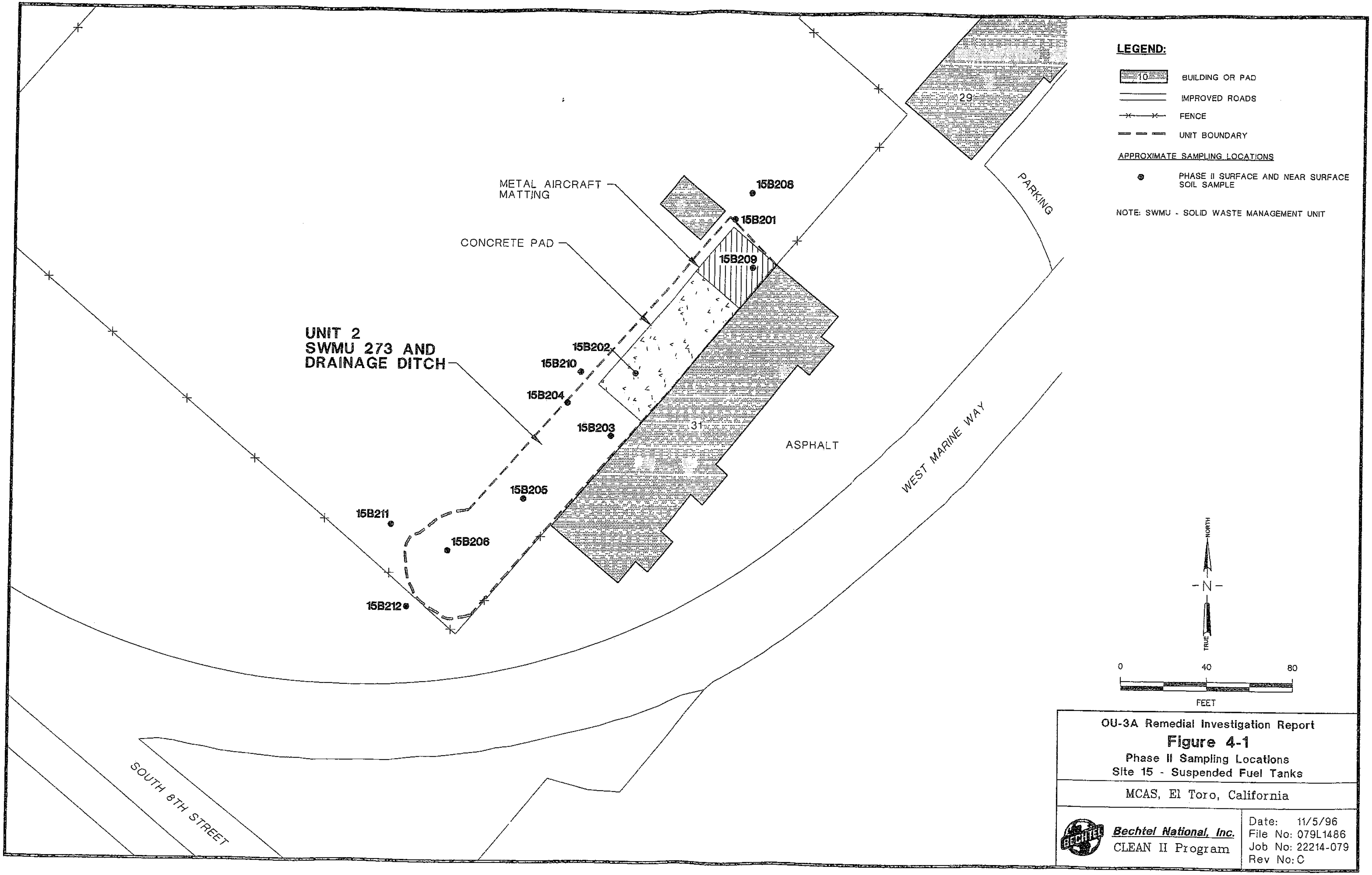
Phase II field screening results (Table 4-2) for shallow-soil samples collected in Unit 2 identified PAHs at concentrations greater than 275 µg/kg in surface soil samples from borings 15B201, 15B202, 15B206, and in the surface and 4.5- to 5-foot-bgs samples from boring 15B210. PAHs were also identified at concentrations between 60 and 275 µg/kg in the surface-soil samples from borings 15B203, 15B204, and 15B206, and in the 3- to 5-foot-bgs samples from borings 15B202 and 15B206. No PAHs were identified in soil samples collected at depths greater than 5 feet bgs. No petroleum hydrocarbons were reported by the mobile laboratory for any of the Site 15 shallow-soil samples analyzed for TPH (Table 4-2).

4.2.2 Unit 2: Fixed-Base Laboratory Results

Fixed-base laboratory results for shallow-soil samples from the Phase II RI of Unit 2 reported PAHs, petroleum hydrocarbons~~motor oil~~, pesticides/PCBs, and TAL metals. The following is a discussion of each reported analyte class at Site 15. A summary of fixed-base laboratory analytical data from the Phase II investigation at Site 15 is presented in Table 4-3.

Polynuclear Aromatic Hydrocarbons

Ten PAH compounds were reported in seven samples from five of seven soil borings sampled for PAHs at Unit 2 (15B201, 15B204, 15B210, 15B211, and 15B212). Reported PAHs include benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, benz(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, and pyrene. The highest concentration of PAHs was 370 µg/kg reported for indeno(1,2,3-c,d)pyrene in the 0- to 1-foot-bgs sample from boring 15B201. The range of reported PAH concentrations from all soil borings was 5.1 to 370 µg/kg. The highest PAH concentrations were reported in surface-soil samples and PAHs were not reported in soil at depths greater than 5 feet bgs. Figure 4-3 presents data for the six carcinogenic PAHs reported in shallow soil at Site 15. Additional PAHs occur in association with these compounds. A complete summary of Phase II analytical data for PAHs is provided in Table 4-3.



OU-3A Remedial Investigation Report

Figure 4-1

Phase II Sampling Locations
Site 15 - Suspended Fuel Tanks

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 11/5/96
File No: 079L1486
Job No: 22214-079
Rev No: C

Table 4-1
Summary of Phase II Soil Sample Analyses

Unit	Sampling Location	PHASE II SAMPLE INTERVALS (feet bgs[a]) Tier 1[b]	Tier 2[b]	FIELD-SCREENING ANALYSES IMMUNOASSAY PAHs[c] U.S. EPA[d] 4035	MOBILE LAB TPH[e] U.S. EPA 8015M	FIXED-BASE LABORATORY ANALYSES PAHs U.S. EPA 8310	TPH U.S. EPA 8015M	Pesticides/ PCBs[f] U.S. EPA 8080	Metals U.S. EPA CLP[g]	Hexavalent Chromium U.S. EPA 7196
2	15B201	0 – 1, 3 – 5, 5 – 6.5, 8 – 10		X	X	X(2)[h]	X(2)	X	X	
	15B202	0.5 – 1.5, 3 – 5, 8 – 10		X	X	X(1)	X(1)	X	X	
	15B203	0 – 1, 3 – 5, 8 – 10		X	X			X	X	
	15B204	0 – 1, 3 – 5, 8 – 10		X	X	X(1)	X(1)	X	X	
	15B205	0 – 1, 3 – 5, 8 – 10		X	X			X	X	
	15B206	0 – 1, 3 – 5, 8 – 10		X	X	X(1)	X(1)	X	X	
	15B208		0 – 0.5, 4.5 – 5, 9.5 – 10						X	
	15B209		0 – 0.5, 4.5 – 5, 9.5 – 10						X	X
	15B210		0 – 0.5, 4.5 – 5, 9.5 – 10	X		X (3)			X	X
	15B211		0 – 0.5, 4.5 – 5, 9.5 – 10	X		X (3)				X
	15B212		0 – 0.5, 4.5 – 5, 9.5 – 10	X		X (3)				

Notes:
a bgs – below ground surface
b Tier 1 and Tier 2 designations in accordance with final Work Plan for the Phase II Remedial Investigation/Feasibility Study
c PAH – polynuclear aromatic hydrocarbon
d U.S. EPA – United States Environmental Protection Agency
e TPH – total petroleum hydrocarbons
f PCB – polychlorinated biphenyl
g CLP – (U.S. EPA) Contract Laboratory Program
h value in parentheses indicates the number of fixed-base laboratory confirmation analyses performed at this location

Total Petroleum Hydrocarbons

Motor oil was reported in two surface-soil samples from two of four boring locations sampled for TPH at Unit 2 (15B201 and 15B204). Motor oil was reported at a concentration of 530 mg/kg in the 0- to 1-foot-bgs interval at boring 15B204 and at 290 mg/kg in the 0- to 1-foot-bgs interval at boring 15B201. TPH was not reported in soil greater than 1 foot bgs. A complete summary of Phase II analytical data for TPH is provided in Table 4-3.

Pesticides

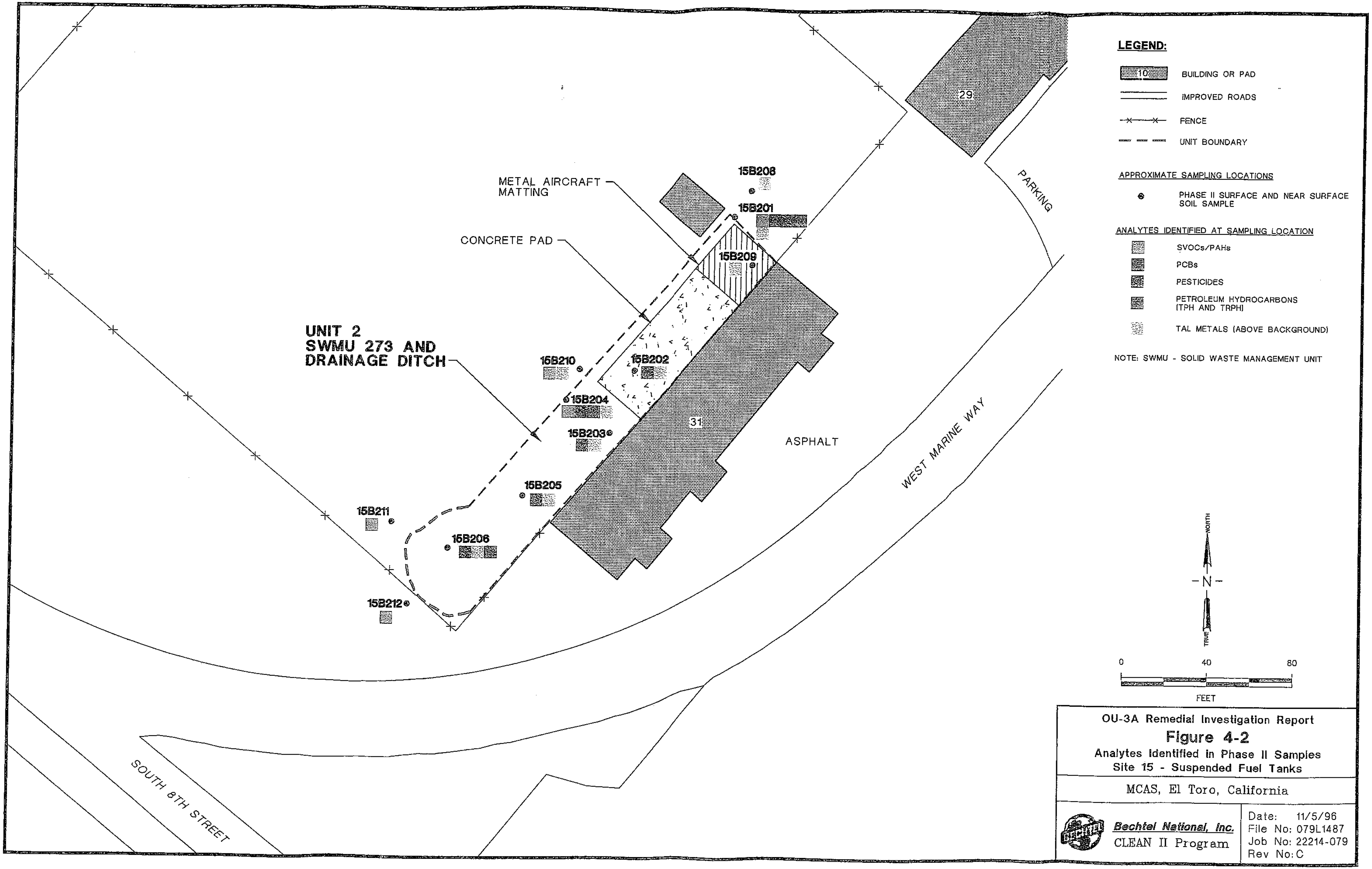
Six pesticides were reported in eight samples from the six boring locations sampled for pesticides at Unit 2 (borings 15B201 through 15B206). The highest concentration of pesticides was 220 µg/kg reported for 4,4′-dichlorodiphenyldichloroethane (DDD) in the 0.5- to 1.5-foot-bgs sample from boring 15B202. Other reported pesticides include 4,4′-dichlorodiphenyltrichloroethane (DDT), 4,4′-dichlorodiphenyldichloroethene (DDE), endosulfan I, alpha-chlordane, and gamma-chlordane. The reported pesticide concentrations ranged from 1.1 to 220 µg/kg. Pesticides were reported most frequently and at the highest concentrations in samples collected from 0 to 1.5 feet bgs. Pesticides were reported at concentrations less than 10 µg/kg in only one sample collected from 3 to 5 feet bgs and one sample from 8 to 10 feet bgs at Site 15. A complete summary of Phase II analytical data for pesticides is provided in Table 4-3.

Polychlorinated Biphenyls

PCBs were reported in two samples from two of six boring locations sampled for PCBs at Unit 2. Aroclor 1260 was reported at a concentration of 31 µg/kg in the surface sample from boring 15B201 and at 29 µg/kg in the surface-soil sample from boring 15B206. No PCBs were reported in any samples from other Site 15 locations. A complete summary of Phase II analytical data for PCBs is provided in Table 4-3.

Metals

Fifteen TAL metals were reported at concentrations above MCAS El Toro background values in 20 shallow-soil samples from all boring locations (15B201 through 15B206, and 15B208, 15B209, and 15B210) sampled for metals at Unit 2. Metals reported at concentrations above background include aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, and zinc. The metal exceeding background by the greatest amount was lead, reported at a concentration 5,440 mg/kg (360 times background) in the 3- to 5-foot-bgs sample from boring 15B205. Lead was also reported at concentrations greater than 10 times background in the surface-soil samples from 15B201 (1,160 mg/kg, 76.8 times background) and 15B204 (194 mg/kg, 12.8 times background). Other metals reported at concentrations greater than five times their respective background levels were antimony, cadmium, and copper. Copper was also the metal reported most frequently at concentrations above background levels. The distribution and concentrations of metals reported at concentrations above background levels at Site 15 are presented in Figure 4-4.



OU-3A Remedial Investigation Report

Figure 4-2

Analytes Identified in Phase II Samples
Site 15 - Suspended Fuel Tanks

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 11/5/96
File No: 079L1487
Job No: 22214-079
Rev No: C

Table 4-2
Site 15 Field-Screening Results

Sample ID	Boring Number	Sample Depth (feet)	PAHs[a] – IMMUNOASSAY 60 µg/kg[e]	PAHs[a] – IMMUNOASSAY 275 µg/kg	TPH[b,c] (mg/kg)[d] Gasoline	TPH[b,c] (mg/kg)[d] Diesel
79O0009[f]	15B201	0 – 1	>	>	ND[g]	ND
79O0010	15B201	3 – 5	<	<	ND	ND
79O0012	15B201	8 – 10	<	<	ND	ND
79O0013	15B202	0.5 – 1.5	>	>	ND	ND
79O0014	15B202	3 – 5	>	<	ND	ND
79O0015	15B202	8 – 10	<	<	ND	ND
79O0016	15B203	0 – 1	>	<	ND	ND
79O0017	15B203	3 – 5	<	<	ND	ND
79O0018	15B203	8 – 10	<	<	ND	ND
79O0019	15B204	0 – 1	>	<	ND	ND
79O0020	15B204	3 – 5	<	<	ND	ND
79O0021	15B204	8 – 10	<	<	ND	ND
79O0022	15B205	0 – 1	>	<	ND	ND
79O0023	15B205	3 – 5	<	<	ND	ND
79O0024	15B205	8 – 10	<	<	ND	ND
79O0025	15B206	0 – 1	>	>	ND	ND
79O0026	15B206	3 – 5	>	<	ND	ND
79O0027	15B206	8 – 10	<	<	ND	ND
79O0037	15B210	0 – 0.5	>	>	NA[h]	NA
79O0038	15B210	4.5 – 5	>	>	NA	NA
79O0039	15B210	9.5 – 10	<	<	NA	NA
79O0040	15B211	0 – 0.5	<	<	NA	NA
79O0041	15B211	4.5 – 5	<	<	NA	NA
79O0042	15B211	9.5 – 10	<	<	NA	NA
79O0043	15B212	0 – 0.5	<	<	NA	NA
79O0044	15B212	4.5 – 5	<	<	NA	NA
79O0045	15B212	9.5 – 10	<	<	NA	NA

Notes:
- [a] PAH – polynuclear aromatic hydrocarbon
- [b] TPH – total petroleum hydrocarbons
- [c] results determined by mobile laboratory analyses
- [d] mg/kg – milligrams per kilogram
- [e] µg/kg – micrograms per kilogram
- [f] shaded rows indicate samples submitted to fixed-base laboratory for confirmation analysis
- [g] ND – nondetect
- [h] NA – not analyzed for these compounds

As the data in Figure 4-4 indicate, metals at concentrations above background were reported in samples collected from throughout the shallow-soil interval at Site 15. Although they were most frequent in soil samples collected between 0 to 1 and 8 to 10 feet bgs, the reported concentrations exceeding background levels by the greatest amount were in samples collected at the surface and from 3 to 5 feet bgs. A complete summary of Phase II analytical data for metals is provided in Table 4-3.

Nine samples from three borings (15B208, 15B209, and 15B210) were analyzed for hexavalent chromium. No hexavalent chromium was identified in these samples.

4.2.3 Unit 2: Summary of Nature and Extent

Evaluation of the field screening and fixed-base laboratory analytical results indicate that PAHs, PCBs, pesticides, petroleum hydrocarbons, and TAL metals are present in the shallow-soil interval at Unit 2. These classes of analytes were most prevalent in surface soil sitewide. The highest concentrations for most analytes were also reported in the surface-soil samples. Metals were the only class of analytes present throughout the 0- to 10-foot shallow-soil interval sitewide. Although PAHs were reported in shallow soil sitewide, they were not identified in samples collected from depths greater than 5 feet bgs. Pesticides were reported in surface soil sitewide, but they were only reported in two samples from different locations at depths below 1 foot bgs. PCBs and petroleum hydrocarbons were limited to surface soil at one and two locations, respectively, in the northern half of Unit 2.

Table 4-3
Unit 2 Phase II Soil Data Summary

Analyte Name/ Method Code	Result Units	SAMPLE LOCATIONS/SAMPLE DEPTH (feet bgs[a]) 15B201 0 – 1	15B201 3 – 5	15B201 5 – 6.5	15B201 8 – 10	15B202 0.5 – 1.5	15B202 3 – 5	15B202 8 – 10	15B203 0 – 1	15B203 3 – 5	15B203 8 – 10	15B204 0 – 1	15B204 3 – 5	15B204 8 – 10	15B205 0 – 1	15B205 3 – 5	15B205 8 – 10	15B206 0 – 1
TPH[b] (U.S. EPA[c] 8015-M)																		
Motor oil	mg/kg[d]	290	—[e]	57 U[f]	—	—	54 U	—	—	—	—	530 J[g]	—	—	—	—	—	—
PAHs[h] (U.S. EPA 8310)																		
Benz(a)anthracene	μg/kg[i]	19 UJ[j]	—	3.9 U	—	—	3.8 U	—	—	—	—	18	—	—	—	—	—	—
Benzo(a)pyrene	μg/kg	18 UJ	—	3.8 U	—	—	3.7 U	—	—	—	—	38 NJ[k]	—	—	—	—	—	—
Benzo(b)fluoranthene	μg/kg	19 UJ	—	3.9 U	—	—	3.8 U	—	—	—	—	39 NJ	—	—	—	—	—	—
Benzo(g,h,i)perylene	μg/kg	140 J	—	9.4 U	—	—	12 U	—	—	—	—	190 NJ	—	—	—	—	—	—
Benzo(k)fluoranthene	μg/kg	19 UJ	—	3.9 U	—	—	3.8 U	—	—	—	—	19 NJ	—	—	—	—	—	—
Chrysene	μg/kg	18 UJ	—	3.8 U	—	—	3.7 U	—	—	—	—	62	—	—	—	—	—	—
Dibenz(a,h)anthracene	μg/kg	45 UJ	—	9.4 U	—	—	9.2 U	—	—	—	—	19 UJ	—	—	—	—	—	—
Fluoranthene	μg/kg	45 U	—	9.4 U	—	—	9.2 U	—	—	—	—	140	—	—	—	—	—	—
Indeno(1,2,3-c,d)pyrene	μg/kg	370 NJ	—	9.4 U	—	—	20 U	—	—	—	—	74 NJ	—	—	—	—	—	—
Pyrene	μg/kg	45 U	—	9.4 U	—	—	9.2 U	—	—	—	—	110	—	—	—	—	—	—
PCBs[l] (U.S. EPA CLP[m]/608-M)																		
Aroclor 1260	μg/kg	31 J	43 U	37 U	39 U	350 U	36 U	37 U	71 U	37 U	39 U	73 U	35 U	38 U	35 U	37 U	36 U	29 J
Pesticides (U.S. EPA CLP/608-M)																		
4,4′-DDD[n]	μg/kg	3.5 U	4.3 U	3.7 U	3.9 U	220	7.8	3.7 U	5.1 J	3.7 U	3.9 U	59	3.5 U	3.8 U	2.5 J	3.7 U	3.6 U	9.9 J
4,4′-DDE[o]	μg/kg	4.1	4.3 U	3.7 U	3.9 U	35 U	3.6 U	3.7 U	8.6	3.7 U	3.9 U	9.2 J	3.5 U	3.8 U	3.5 U	3.7 U	3.6 U	18 J
4,4′-DDT[p]	μg/kg	15	4.3 U	3.7 U	3.9 U	23 J	1.7 J	3.7 U	74 J	3.7 U	3.9 U	5 J	3.5 U	3.8 U	14 J	3.7 UJ	4.8 J	94 J
alpha-chlordane	μg/kg	1.8 U	2.2 U	1.9 U	2 U	18 U	1.9 U	1.9 U	3.7 U	1.9 U	2 U	3.8 U	1.8 U	2 U	1.8 U	1.9 U	1.9 U	1.1 J
gamma-chlordane	μg/kg	1.8 U	2.2 U	1.9 U	2 U	18 U	1.9 U	1.9 U	3.7 U	1.9 U	2 U	3.8 U	1.8 U	2 U	1.8 U	1.9 U	1.9 U	1.3 J
Endosulfan I	μg/kg	1.8 U	2.2 U	1.9 U	2 U	18 U	1.9 U	1.9 U	3.7 U	1.9 U	2 U	3.2 J	1.8 U	2 U	1.8 U	1.9 U	1.9 U	1.9 UJ
Metals (U.S. EPA CLP)																		
Aluminum (14,800)[q]	mg/kg	7,200	6,210	18,000	22,400	10,100	14,200	14,100	11,000	7,360	22,100	6,430	3,470	19,500	5,690	18,200	11,700	6,410
Antimony (3.06)	mg/kg	40.8 J	—[r]	—	0.57 UJ	0.79 J	—	—	0.97 J	0.46 J	—	7.7 J	—	—	1.7 J	—	0.57 J	0.99 J
Arsenic (6.86)	mg/kg	7.6 U	2.6 U	3.5 U	5.6 U	3.3	3.3	4.3	6	3.9	5.4	2.8 U	1.4 U	4.4	3.3 U	4.5	4.5	2.6 U
Barium (173)	mg/kg	103	79.1	140	210	82.8	118	151	114	97.5	214	302	36.9	292	62.7	171	163	82.3
Beryllium (0.669)	mg/kg	0.078 U	0.1 U	0.37	0.57	0.32 U	0.43	0.47	0.34 U	0.32 U	0.69	0.17 U	0.13 U	0.68	0.23 U	0.63 U	0.41 U	0.22 U
Cadmium (2.35)	mg/kg	10.1	0.43	0.42	0.58	1.5	0.37 U	0.41 U	4.3	0.48	0.3 U	17.6	0.26 U	0.54	2.9	0.39	0.49	1.4
Chromium (26.9)	mg/kg	64.5	5.9	13.4	17.9	15.2	11.2	12.5	16.8	7.2	18.7	40	4.2	17.2	11	14.9	11.1	9.7
Cobalt (6.98)	mg/kg	10.1	3	6.8	10	10	6.4	7.4	5.6	4.3	10.4	5.7	1.9	10	4.1	8.2	6.6	3.9
Copper (10.5)	mg/kg	63.9	3.3	8.1	11	18.1	6.7	7.5	17.2	14.5	11.7	81.6	2.3	11	11.8	9.9	11.4	10.4
Lead (15.1)	mg/kg	1160 J	1.6 UJ	3.7 J	4.8 J	51.4	4.7	3.6	68.4	2.7	5.2	194	1.5	4.4	46.3	5,440	3.8	45
Manganese (291)	mg/kg	277	148	261	338	217	236	272	244	173	360	156	94	360	145 J	300 J	245 J	156
Mercury (0.22)	mg/kg	0.028 U	0.041 U	0.044 U	0.046 U	0.19	0.031 U	0.032 U	0.039	0.028 U	0.041 U	0.029 U	0.035 U	0.041 U	0.042 U	0.036 U	0.041 U	0.086
Nickel (15.3)	mg/kg	17.9	3.3	7.6	9.7	7.9	8	7.6	11.4	4.9	10.6	14.5	3.2	11.1	6.9	9	7.4	6.4
Silver (0.539)	mg/kg	0.14 U	0.14 U	0.15 U	0.095 U	0.16 U	0.15 U	0.16 U	0.16 U	0.12 U	0.16 U	0.63	0.12 U	0.14 U	0.13 U	0.14 U	0.15 U	0.14
Thallium (0.42)	mg/kg	0.45 U	0.45 U	0.5 U	0.31 U	0.52 U	0.48 U	0.51 U	0.52 U	0.4 U	0.53 U	0.47 U	0.39 U	0.47 U	0.44 U	0.45 U	0.6	0.42 U
Vanadium (71.8)	mg/kg	29.7	22.2	43.8	60.9	27.3	36.7	42.5	30.9	23.6	60.1	20.4	12.4	54.7	18.5	46.4	36.1	21.8
Zinc (77.9)	mg/kg	229	21.2	46.8	70.1	64.8	50.1	51.7	134	31.1	75.5	314	17	75	103 J	89.3 J	45.8 J	82.1

(table continues)

Table 4-3 (continued)

Analyte Name/ Method Code	Result Units	SAMPLE LOCATIONS/SAMPLE DEPTH (feet bgs[a]) 15B206 3 – 5	15B206 8 – 10	15B208 0 – 0.5	15B208 4.5 – 5	15B208 9.5 – 10	15B209 0 – 0.5	15B209 4.5 – 5	15B209 9.5 – 10	15B210 0 – 0.5	15B210 4.5 – 5	15B210 9.5 – 10	15B211 0 – 0.5	15B211 4.5 – 5	15B211 9.5 – 10	15B212 0 – 0.5	15B212 4.5 – 5	15B212 9.5 – 10
TPH (U.S. EPA 8015-M)																		
Motor oil	mg/kg	—	57 U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PAHs (U.S. EPA 8310)																		
Benz(a)anthracene	µg/kg	—	4 U	—	—	—	—	—	—	11 U	11 U	4.4 U	3.7 U	7	4.5 U	3.8 U	3.9 U	4.3 U
Benzo(a)pyrene	µg/kg	—	3.9 U	—	—	—	—	—	—	11 U	11 U	4.2 U	3.6 U	13	4.4 U	6.2	3.8 U	4.2 U
Benzo(b)fluoranthene	µg/kg	—	4 U	—	—	—	—	—	—	11 U	12	4.4 U	3.7 U	22	4.5 U	7.5	3.9 U	4.3 U
Benzo(g,h,i)perylene	µg/kg	—	9.5 U	—	—	—	—	—	—	26 U	37 U	10 U	8.9 U	30	11 U	19 J	14	10 U
Benzo(k)fluoranthene	µg/kg	—	4 U	—	—	—	—	—	—	11 U	11 U	4.4 U	3.7 U	5.1	4.5 U	3.8 U	3.9 U	4.3 U
Chrysene	µg/kg	—	3.9 U	—	—	—	—	—	—	11 U	14	4.2 U	3.6 U	16	4.4 U	3.6 U	3.8 U	4.2 U
Dibenz(a,h)anthracene	µg/kg	—	9.5 U	—	—	—	—	—	—	55	48 U	10 U	8.9 U	11	11 U	17	9.4 U	10 U
Fluoranthene	µg/kg	—	9.5 U	—	—	—	—	—	—	26 U	30	10 U	8.9 U	27	11 U	9 U	9.4 U	10 U
Indeno(1,2,3-c,d)pyrene	µg/kg	—	9.5 U	—	—	—	—	—	—	120	110 U	10 U	8.9 U	18	11 U	39	9.4 U	10 U
Pyrene	µg/kg	—	9.5 U	—	—	—	—	—	—	26 U	37	10 U	8.9 U	24	11 U	9 U	9.4 U	10 U
PCBs (U.S. EPA CLP/608-M)																		
Aroclor 1260	µg/kg	34 U	37 U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pesticides (U.S. EPA CLP/608-M)																		
4,4′-DDD	µg/kg	3.4 U	3.7 U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4,4′-DDE	µg/kg	3.4 U	3.7 U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4,4′-DDT	µg/kg	3.4 U	3.7 U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
alpha-chlordane	µg/kg	1.7 U	1.9 U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
gamma-chlordane	µg/kg	1.7 U	1.9 U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Endosulfan I	µg/kg	1.7 U	1.9 U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Metals (U.S. EPA CLP)																		
Aluminum (14,800)	mg/kg	10,700	11,600	5,350	6,190	20,000	3,010	5,320	24,600	6,050	5,540	27,200	—	—	—	—	—	—
Antimony (3.06)	mg/kg	–	–	0.68 J	0.25 J	0.28 J	0.58 J	–	–	–	0.73 J	0.7 J	—	—	—	—	—	—
Arsenic (6.86)	mg/kg	2.4 U	2.7 U	2.3	1.7	4.4	10.3	1.5	5.2	3.8	2.9	5	—	—	—	—	—	—
Barium (173)	mg/kg	98.2	111	170	84.9	199	16.4	80.8	262	82.4	96.3	209	—	—	—	—	—	—
Beryllium (0.669)	mg/kg	0.29 U	0.27 U	0.12	0.26	0.63	0.21	0.18	0.91	0.15	0.16	0.76	—	—	—	—	—	—
Cadmium (2.35)	mg/kg	0.18 U	0.23 U	0.44	0.93	1.1	0.37 U	0.4 U	1.8	1.7	2.1	0.44	—	—	—	—	—	—
Chromium (26.9)	mg/kg	9	9.8	6.4	5.5	16.7	3	5.1	21.1	11	13	22.1	—	—	—	—	—	—
Cobalt (6.98)	mg/kg	5.3	5.6	4.5	3.5	9	1.9	3.4	11.4	3.6	3.9	11.2	—	—	—	—	—	—
Copper (10.5)	mg/kg	5.6	6.1	7.8	3.8	11.6	7.1	3.4	16.7	9.8	12.3	13.6	—	—	—	—	—	—
Lead (15.1)	mg/kg	5.6	2.6	7.5 J	1.7 J	4.5 J	22.8 J	1.3 J	5.4 J	55.7 J	84.3 J	5.6 J	—	—	—	—	—	—
Manganese (291)	mg/kg	211	224	221	158 J	338 J	43.5 J	152 J	447 J	140	165	404	—	—	—	—	—	—
Mercury (0.22)	mg/kg	0.04 U	0.034 U	0.067 U	0.054 U	0.099 U	0.055 U	0.071 U	0.13 U	0.084 U	0.1	0.11 U	—	—	—	—	—	—
Nickel (15.3)	mg/kg	4.7	5.9	13.2	3.7	11.3	3.5	4	15.7	5.7	6	13	—	—	—	—	—	—
Silver (0.539)	mg/kg	0.14 U	0.12 U	0.22 U	0.24 U	0.24 U	0.24 U	0.22 U	0.29 U	0.24 U	0.21 U	0.31 U	—	—	—	—	—	—
Thallium (0.42)	mg/kg	0.69 U	0.4 U	0.8 U	0.87 U	0.85 U	0.86 U	0.79 U	1 U	0.86 U	0.78 U	1.1 U	—	—	—	—	—	—
Vanadium (71.8)	mg/kg	30.1	34.3	23.9	19.5	54.9	12.1	18.4	70.2	20.2	19.3	71.1	—	—	—	—	—	—
Zinc (77.9)	mg/kg	41.5	38.4	51.7 J	25.6 J	65.8 J	41.5 J	23.5 J	89.8 J	57.6	64.8	80.9	—	—	—	—	—	—

(table continues)

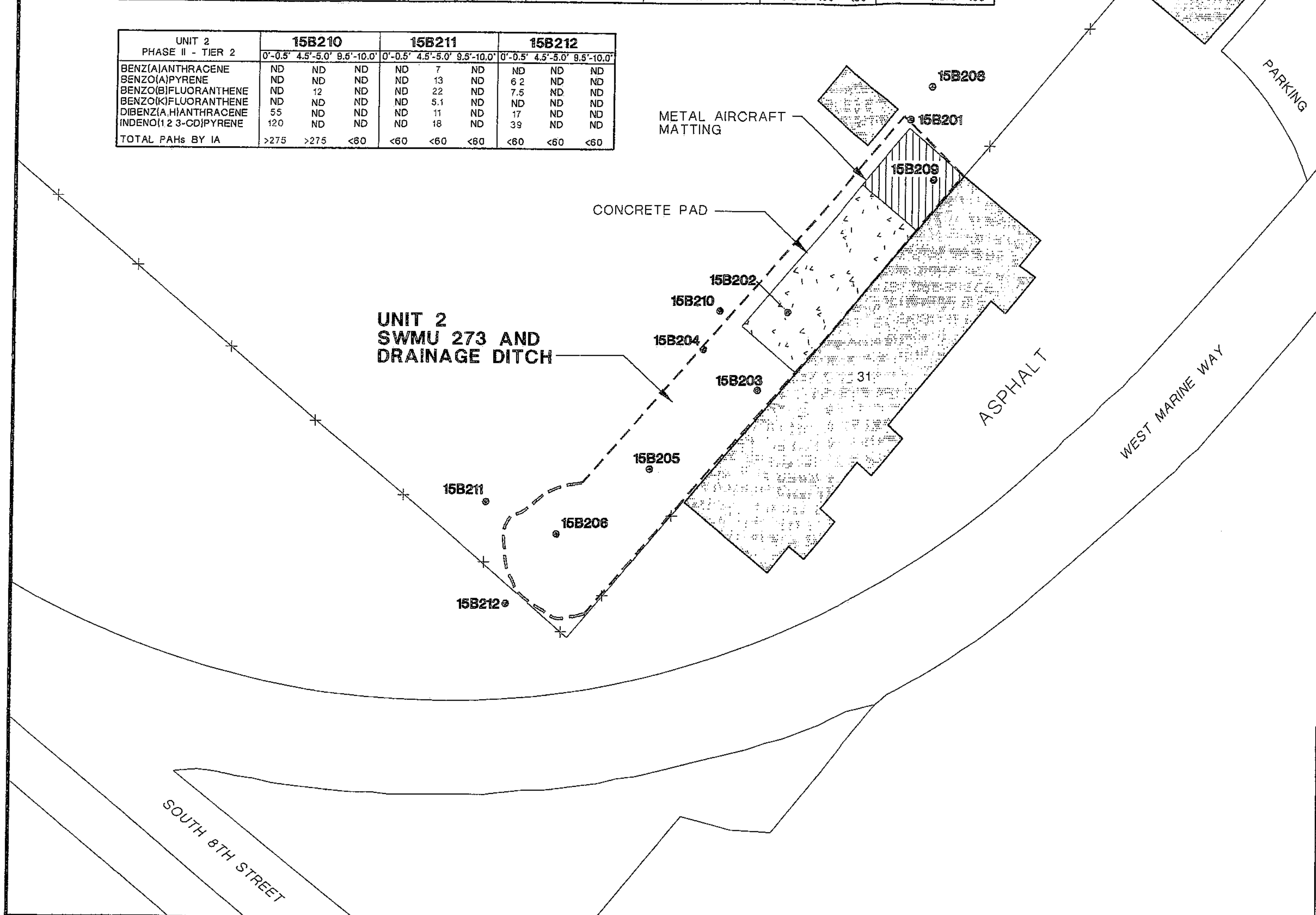
Table 4-3 (continued)

Notes:

[a] bgs – below ground surface
[b] TPH – total petroleum hydrocarbons
[c] U.S. EPA – United States Environmental Protection Agency
[d] mg/kg – milligrams per kilogram
[e] — – not analyzed
[f] U – compound not detected
[g] J – estimated value
[h] PAH – polynuclear aromatic hydrocarbon
[i] µg/kg – micrograms per kilogram
[j] UJ – compound not detected, estimated detection limit
[k] NJ – estimated value, compound was identified on the basis of presumptive evidence through a search of the mass spectral library
[l] PCB – polychlorinated biphenyl
[m] CLP – (U.S. EPA) Contract Laboratory Program
[n] DDD – dichlorodiphenyldichloroethane
[o] DDE – dichlorodiphenyldichloroethene
[p] DDT – dichlorodiphenyltrichloroethane
[q] values in parentheses are background concentrations for metals at Marine Corps Air Station El Toro (See Appendix D)
[r] ~ – data determined unusable by validation contractor

UNIT 2 PHASE II - TIER 1	15B201				15B202.			15B203			15B204			15B205			15B206		
	0'-1.0'	3'-5.0'	5'-6.5'	8'-10.0'	0.5'-1.5'	3'-5.0'	8'-10.0'	0'-1.0'	3'-5.0'	8'-10.0'	0'-1.0'	3'-5.0'	8'-10.0'	0'-1.0'	3'-5.0'	8'-10.0'	0'-1.0'	3'-5.0'	8'-10.0'
BENZ(A)ANTHRACENE	ND	-	ND	-	-	ND	-	-	-	-	18	-	-	-	-	-	-	-	ND
BENZO(A)PYRENE	ND	-	ND	-	-	ND	-	-	-	-	38	-	-	-	-	-	-	-	ND
BENZO(B)FLUORANTHENE	ND	-	ND	-	-	ND	-	-	-	-	39	-	-	-	-	-	-	-	ND
BENZO(K)FLUORANTHENE	ND	-	ND	-	-	ND	-	-	-	-	19	-	-	-	-	-	-	-	ND
DIBENZ(A,H)ANTHRACENE	ND	-	ND	-	-	ND	-	-	-	-	ND	-	-	-	-	-	-	-	ND
INDENO(1 2,3-CD)PYRENE	370	-	ND	-	-	ND	-	-	-	-	74	-	-	-	-	-	-	-	ND
TOTAL PAHs BY IA	>275	<60	-	<60	>275	>60,<275	<60	>60,<275	<60	<60	>275	<60	<60	>60,<275	<60	<60	>275	>60,<275	<60

UNIT 2 PHASE II - TIER 2	15B210			15B211			15B212		
	0'-0.5'	4.5'-5.0'	9.5'-10.0'	0'-0.5'	4.5'-5.0'	9.5'-10.0'	0'-0.5'	4.5'-5.0'	9.5'-10.0'
BENZ(A)ANTHRACENE	ND	ND	ND	ND	7	ND	ND	ND	ND
BENZO(A)PYRENE	ND	ND	ND	ND	13	ND	6 2	ND	ND
BENZO(B)FLUORANTHENE	ND	12	ND	ND	22	ND	7.5	ND	ND
BENZO(K)FLUORANTHENE	ND	ND	ND	ND	5.1	ND	ND	ND	ND
DIBENZ(A,H)ANTHRACENE	55	ND	ND	ND	11	ND	17	ND	ND
INDENO(1 2 3-CD)PYRENE	120	ND	ND	ND	18	ND	39	ND	ND
TOTAL PAHs BY IA	>275	>275	<60	<60	<60	<60	<60	<60	<60



LEGEND:

10 BUILDING OR PAD

IMPROVED ROADS

FENCE

UNIT BOUNDARY

APPROXIMATE SAMPLING LOCATIONS

PHASE II SURFACE AND NEAR SURFACE SOIL SAMPLE

UNIT 1 PHASE I	15B212		
	0'-0.5'	4.5'-5'	9.5'-10'
BENZO(A)PYRENE	6 2	ND	ND

SAMPLE LOCATION

DEPTH (IN FEET) SAMPLE TAKEN

ANALYTE

COLOR NUMBER INDICATES DETECTION

CONCENTRATION

NOTES: ALL VALUES ARE IN MICROGRAMS PER KILOGRAM (μg/kg)
REPORTED TOTAL PAH RESULTS BY IMMUNOASSAY ANALYSIS ARE CALIBRATED TO PHENATHRENE STANDARD
SWMU = SOLID WASTE MANAGEMENT UNIT
IA = IMMUNOASSAY ANALYSIS
ND = NOT DETECTED
- = NOT ANALYZED

NORTH
N
TRUE

0 40 80
FEET

OU-3A Remedial Investigation Report

Figure 4-3

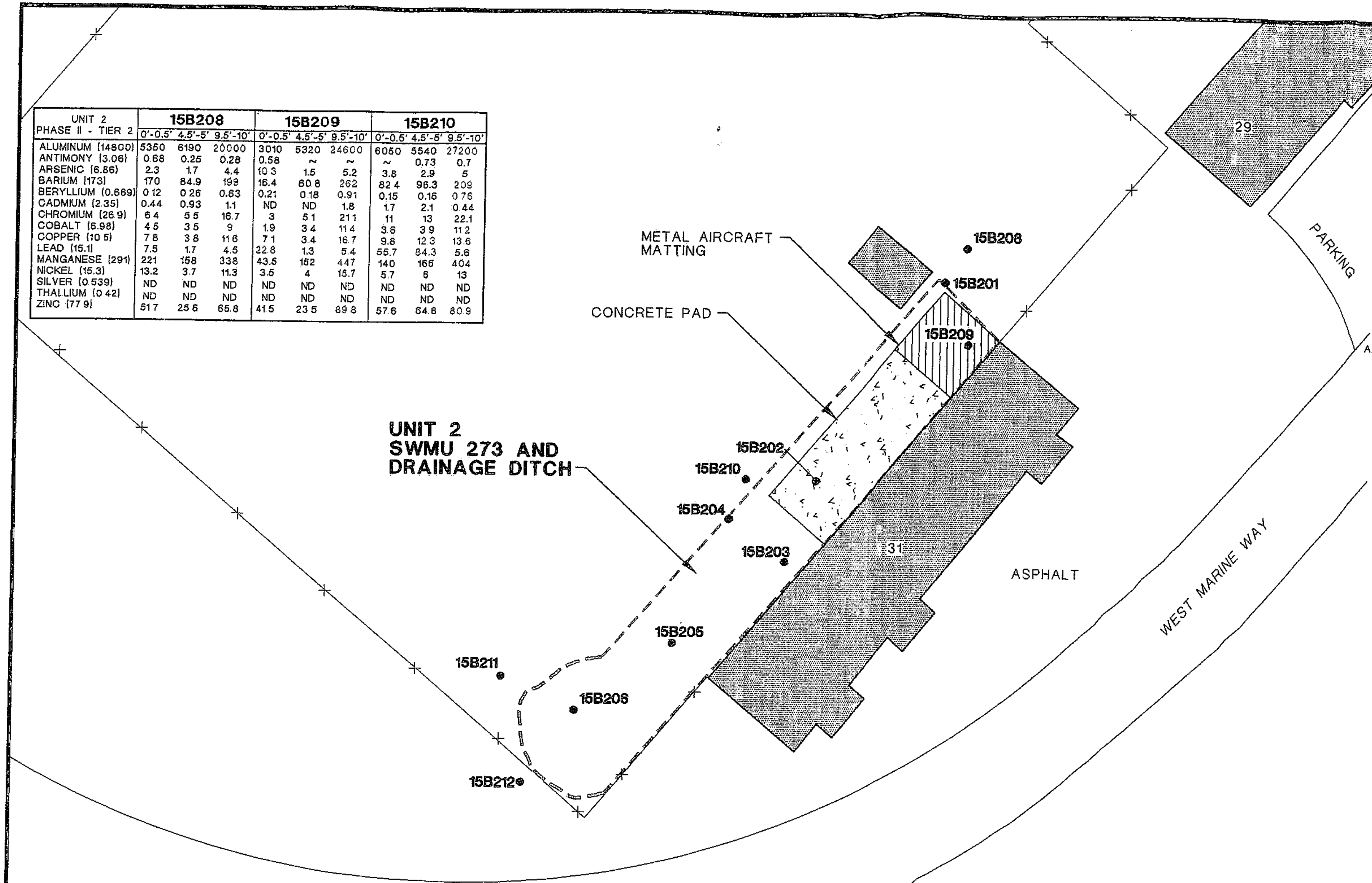
Carcinogenic PAHs in Shallow Soil
Site 15 - Suspended Fuel Tanks

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 11/5/96
File No: 079A1613
Job No: 22214-079
Rev No: C

UNIT 2 PHASE II - TIER 2	15B208			15B209			15B210		
	0'-0.5'	4.5'-5'	9.5'-10'	0'-0.5'	4.5'-5'	9.5'-10'	0'-0.5'	4.5'-5'	9.5'-10'
ALUMINUM (14800)	5350	6190	20000	3010	5320	24600	6050	5540	27200
ANTIMONY (3.06)	0.68	0.25	0.28	0.58	~	~	~	0.73	0.7
ARSENIC (6.86)	2.3	1.7	4.4	10 3	1.5	5.2	3.8	2.9	5
BARIUM (173)	170	84.9	199	16.4	80 8	262	82 4	96.3	209
BERYLLIUM (0.669)	0 12	0 26	0.63	0.21	0.18	0.91	0.15	0.16	0 76
CADMIUM (2.35)	0.44	0.93	1.1	ND	ND	1.8	1.7	2.1	0.44
CHROMIUM (26 9)	6 4	5 5	16.7	3	5 1	21 1	11	13	22.1
COBALT (6.98)	4 5	3 5	9	1.9	3 4	11 4	3.6	3 9	11 2
COPPER (10 5)	7 8	3 8	11 6	7 1	3.4	16.7	9.8	12.3	13.6
LEAD (15.1)	7.5	1.7	4.5	22.8	1.3	5.4	55.7	84.3	5.6
MANGANESE (291)	221	158	338	43.5	152	447	140	165	404
NICKEL (15.3)	13.2	3.7	11.3	3.5	4	15.7	5.7	6	13
SILVER (0 539)	ND	ND	ND	ND	ND	ND	ND	ND	ND
THALLIUM (0 42)	ND	ND	ND	ND	ND	ND	ND	ND	ND
ZINC (77 9)	51 7	25 6	65.8	41.5	23 5	89 8	57.6	64.8	80.9



NOTES: ALL VALUES ARE IN MILLIGRAMS PER KILOGRAM (mg/kg)

COMMONLY OCCURRING METALS CONSIDERED ESSENTIAL NUTRIENTS (CALCIUM, IRON, MAGNESIUM, POTASSIUM, AND SODIUM) ARE NOT IDENTIFIED IN THIS FIGURE

SWMU - SOLID WASTE MANAGEMENT UNIT
AOC - AREA OF CONCERN
ND - NOT DETECTED
~ - DATA DETERMINED UNUSABLE BY VALIDATION CONTRACTOR

UNIT 2 PHASE II - TIER 1	15B201				15B202			15B203		
	0'-1.0'	3'-5.0'	5'-6.5'	8'-10.0'	0.5'-1.5'	3'-5.0'	8'-10.0'	0'-1.0'	3'-5.0'	8'-10.0'
ALUMINUM (14800)	7200	6210	18000	22400	10100	14200	14100	11000	7360	22100
ANTIMONY (3.06)	40.8	~	~	ND	0.79	~	~	0 97	0.46	~
ARSENIC (6.86)	ND	ND	ND	ND	3.3	3.3	4.3	6	3.9	5.4
BARIUM (173)	103	79.1	140	210	82.8	118	151	114	97.5	214
BERYLLIUM (0.669)	ND	ND	0 37	0 57	ND	0.43	0.47	ND	ND	0.69
CADMIUM (2.35)	10 1	0.43	0.42	0.58	1.5	ND	ND	4.3	0.48	ND
CHROMIUM (26 9)	64 5	5.9	13.4	17.9	15.2	11 2	12 5	16.8	7 2	18.7
COBALT (6.98)	10 1	3	6.8	10	10	6.4	7 4	5.6	4 3	10.4
COPPER (10.5)	63 9	3.3	8 1	11	18 1	6.7	7.5	17 2	14 5	11.7
LEAD (15.1)	1160	ND	3.7	4.8	51.4	4.7	3.6	68 4	2.7	5.2
MANGANESE (291)	277	148	261	338	217	236	272	244	173	360
NICKEL (15.3)	17.9	3.3	7.6	9.7	7.9	8	7.6	11.4	4.9	10.6
SILVER (0 539)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
THALLIUM (0.42)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ZINC (77.9)	229	212	46 8	70.1	64.8	50.1	517	134	31.1	75 5

UNIT 2 PHASE II - TIER 1	15B204			15B205			15B206		
	0'-1.0'	3'-5.0'	8'-10.0'	0'-1.0'	3'-5.0'	8'-10.0'	0'-1.0'	3'-5.0'	8'-10.0'
ALUMINUM (14800)	6430	3470	19500	5690	18200	11700	6410	10700	11600
ANTIMONY (3.06)	7.7	~	~	1.7	~	0.57	0.99	~	~
ARSENIC (6.86)	ND	ND	4.4	ND	4.5	4.5	ND	ND	ND
BARIUM (173)	302	36.9	292	62.7	171	163	82.3	98.2	111
BERYLLIUM (0.669)	ND	ND	0 68	ND	ND	ND	ND	ND	ND
CADMIUM (2.35)	17.6	ND	0.54	2.9	0.39	0.49	1 4	ND	ND
CHROMIUM (26 9)	40	4.2	17.2	11	14.9	11.1	9 7	9	9 8
COBALT (6.98)	5 7	1.9	10	4 1	8 2	6 6	3.9	5.3	5.6
COPPER (10.5)	81.6	2.3	11	11 8	9.9	11 4	10.4	5 6	6.1
LEAD (15.1)	194	1.5	4.4	46 3	5440	3.8	45	5.6	2.6
MANGANESE (291)	156	94	360	146	300	245	156	211	224
NICKEL (15.3)	14.5	3.2	11.1	6.9	9	7.4	6.4	4.7	5.9
SILVER (0 539)	0.63	ND	ND	ND	ND	ND	0.14	ND	ND
THALLIUM (0.42)	ND	ND	ND	ND	ND	0.6	ND	ND	ND
ZINC (77.9)	314	17	75	103	89 3	45.8	82 1	41.5	38.4

OU-3A Remedial Investigation Report

Figure 4-4

Total Metals Above Background in Shallow Soil
Site 15 - Suspended Fuel Tanks

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 10/18/96
File No: 079L1489
Job No: 22214-079
Rev No: C

Section 5
FATE AND TRANSPORT

This section contains the fate-and-transport analysis for Site 15. It includes a discussion of the physical and chemical changes that may occur to contaminants present at the site and a discussion of mechanisms that could potentially transfer the contaminants off-site.

Section 5.1 introduces the Site 15 conceptual model. This model provides an understanding of the present site conditions by incorporating site-specific physical characteristics, nature and extent of contaminants in the physical system, and potential migration pathways. The pathways analysis is detailed in Section 5.1.3.

Section 5.2 presents a brief discussion of the fate of the contaminants identified at Site 15. Included in this section is a discussion of the chemical groups identified at Site 15 and their mobility and persistence in the environment. A discussion of fate for each group of the contaminants identified at the OU-3A sites is presented in Section 5 of the main body of this report and is not reiterated in this attachment. Section 5 of the main body of this report also discusses the physical and chemical properties of contaminants that affect contaminant transport and persistence in the environment.

Section 5.3 presents a discussion of transport pathways and evaluates the potential of each pathway to transport contaminants off-site.

5.1 CONCEPTUAL MODEL

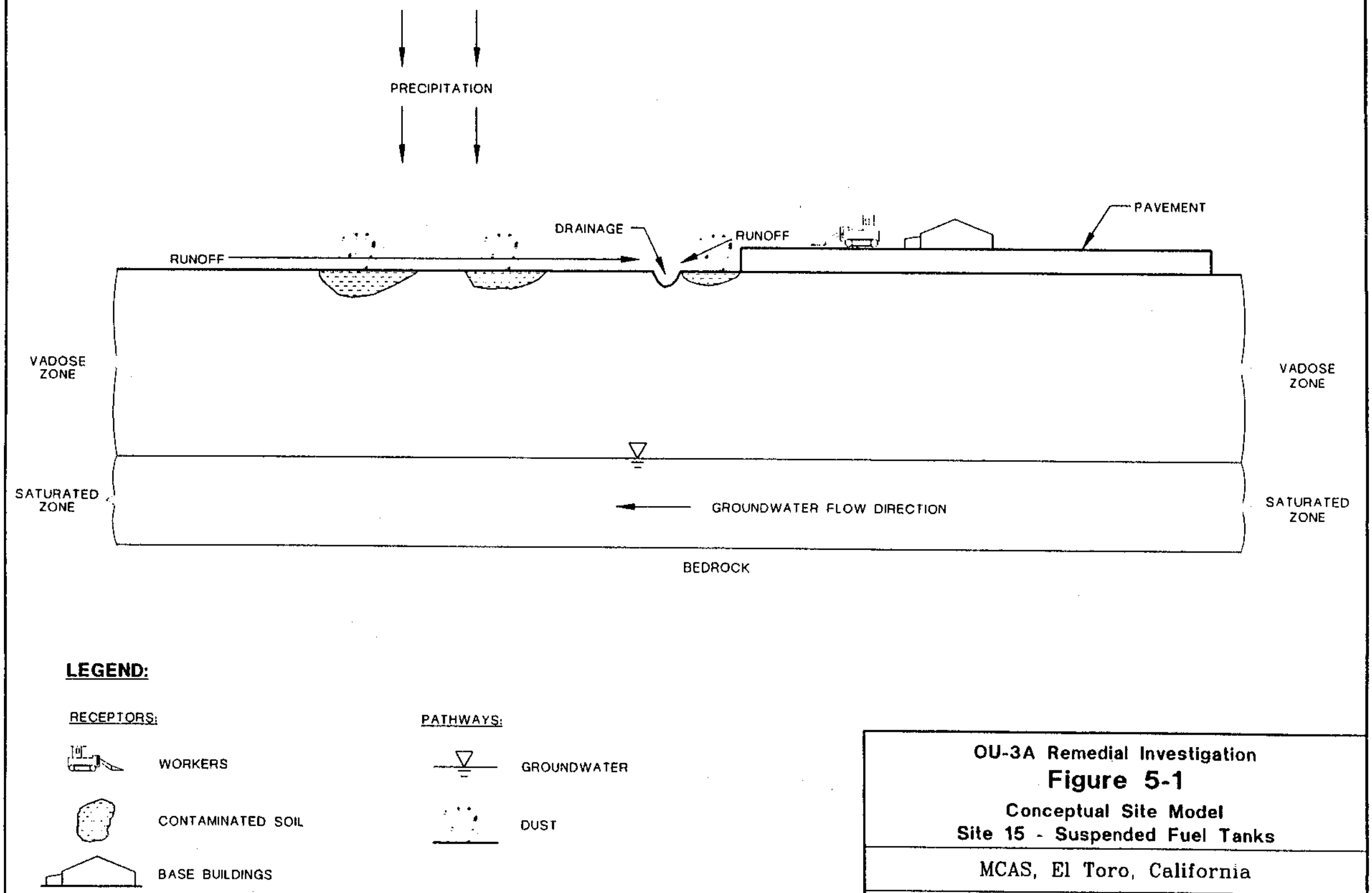
This section summarizes the pertinent geologic/hydrogeologic and surface drainage characteristics influencing the fate and transport of chemicals reported at Site 15. The section also summarizes the distribution of the chemicals in the physical system. These site-specific characteristics are used to develop the potential migration pathways analysis, which completes the site-specific conceptual model (Figure 5-1).

5.1.1 Physical Characteristics of the Site

Based on a review of the RI boring logs, the subsurface lithology at Site 15 consists primarily of fine- to coarse-grained sand, silty sand, and clayey- to sandy-silt. These sediments have moderate to high porosity and low-to-moderate permeability. The surface soil at Site 15 develops on nearly flat (0 to 3 percent slope) floodplain deposits and is typically a well-drained soil characterized by slow surface runoff and a slight erosion hazard due to the nearly flat surface.

The principal aquifer is present at a depth of approximately 130 feet bgs at Site 15. The regional groundwater flow direction in the area of the site is generally to the west-northwest. The hydraulic gradient in the area of the site has been influenced strongly by the pumping of irrigation wells located west of MCAS El Toro.

The mean annual rainfall at MCAS El Toro is approximately 12.2 inches, most of which occurs from November through April. Due to the low average-annual rainfall and high evapotranspiration rates, net infiltration from precipitation is low (less than 5 inches per year) (BNI 1996a). Surface flow is induced only during significant rainfall events



NOT TO SCALE

OU-3A Remedial Investigation

Figure 5-1

Conceptual Site Model
Site 15 - Suspended Fuel Tanks

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 11/5/96
File No: 079M1629
Job No: 22214-079
Rev No: C

From March through October, the prevailing wind is from the west and averages 6 knots. From November through February, the prevailing wind is from the east and averages 4 knots. Strong, dry, gusty, offshore winds (locally known as Santa Ana winds) are common during the late fall and early winter.

The site surface is generally covered with dirt and gravel, except for the concrete pad and aircraft matting areas abutting Building 31. Surface drainage from the site appears to flow from northeast to southwest along a shallow drainage ditch that extends from the concrete pad southwest to the site perimeter fence. Surface-water drainage is a potential pathway for movement of contaminated surface soils as suspended particulates and for dissolved-phase transport in surface-water runoff.

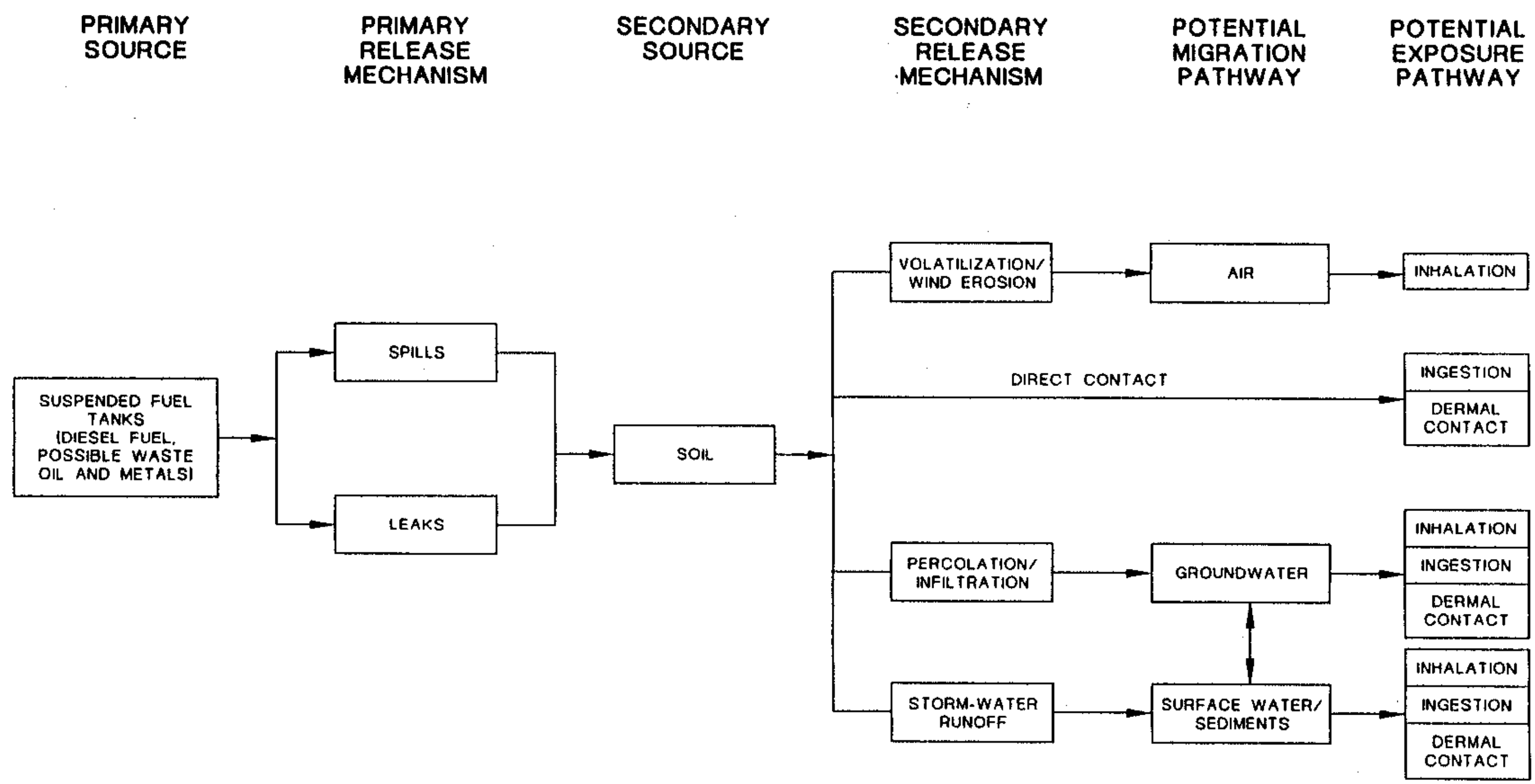
5.1.2 Distribution of Contaminants

PAHs, PCBs, pesticides, motor oil, and TAL metals were reported in soil samples. PAHs, pesticides, and metals were reported in samples collected from boring locations throughout Unit 2. The highest concentrations of PAHs were reported in a surface sample collected from the northeastern corner of Unit 2 (boring 15B201). PAHs were not reported in samples collected at depths of greater than 5 feet bgs. The highest concentration of pesticides was found in a surface-soil sample collected from beneath the concrete pad in Unit 2 (boring 15B202). With two exceptions, pesticides were only reported in surface-soil samples. Motor oil was reported in surface samples collected from two locations in the center and northeast corner of Unit 2, respectively (borings 15B204 and 15B201). Similarly, PCBs were only reported in one surface-soil sample collected from the northeast corner of Unit 2. TAL metals were also reported above background in samples collected between 0 and 10 feet bgs from all boring locations in Unit 2. Except for TAL metals, all other chemicals were generally not reported in samples collected deeper than 5 feet bgs.

5.1.3 Potential Migration Pathways

The primary sources of contamination at Unit 2 were from equipment maintenance and cleaning activities conducted at Site 15. Site operations generated waste oil, waste motor fuel, empty paint cans, and paint thinner.

The potential migration pathways at Site 15 are transport via air, surface water, or soil infiltration (Figure 5-2). Airborne contaminants can be transported in association with fugitive dust or by volatilization directly to the air. Unpaved areas of the site are most susceptible to generation of fugitive dust. The transport of dust through air is affected by wind speed and direction and weather conditions. Transportation of airborne contaminants through volatilization is expected to be negligible at this site. VOCs were not associated with site operations, and thus, soil samples were not analyzed for VOCs during the Phase II RI. Moreover, volatile petroleum hydrocarbons (e.g., gasoline) were not reported in soil samples collected at Site 15. Vapor monitoring for VOCs was performed for health and safety during the field investigation, and VOCs were not identified by the field instruments.



OU-3A Remedial Investigation Report

Figure 5-2

Potential Migration Pathways
Site 15 - Suspended Fuel Tanks

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 10/30/96
File No: 079C1630
Job No: 22214-079
Rev No: B

Waterborne contaminants can be transported in association with suspended particulates or as solutes or colloids in the surface water itself. Surface-water transport is affected by the amount of rainfall or ~~other~~ water from other sources, type of contaminant, surface properties, and the topography of the area. The surface-water transport pathway allows movement of chemicals off-site to the surrounding area.

Chemicals in surface soil can be leached downward through the soil profile along with infiltration. Due to low net infiltration prevalent at the site, transport of contaminants through soil by this pathway is expected to be negligible. Analytical results indicating that impacted soil is limited to less than 10 feet bgs support this interpretation.

5.2 CONTAMINANT MOBILITY AND PERSISTENCE

Contaminant mobility refers to the tendency of a contaminant to move along a pathway in response to a driving force. Contaminant persistence refers to the tendency of a chemical to resist transformation or degradation. A chemical that is immobile and persistent in the environment tends to remain in place. The tendency toward immobility and persistence is a function of site-specific characteristics and the physical and chemical properties of the contaminants. To facilitate discussion of contaminant persistence, OU-3A contaminants have been listed in Table 5-1 by chemical group in Section 5 of the main body of this report. As summarized in Section 5.2 of the main body of this report, each chemical group has similar physicochemical properties that influence contaminant persistence or mobility in the environment. The following subsections summarize the mobility and persistence of the groups of chemicals identified at Site 15.

5.2.1 Organic Compounds

The mobility and persistence of organic compounds is governed by their physicochemical properties and the transformation mechanisms that act on them. The following subsections discuss the properties of the groups of chemicals that were identified at Site 15. The mobility and persistence of selected organic compounds identified at Site 15 are shown on Table 5-1.

5.2.1.1 SEMIVOLATILE ORGANIC COMPOUNDS

PAHs were the predominant class of SVOCs reported at Site 15. As a chemical group, PAHs have low water solubility and a high affinity for sorption to organic matter (high organic carbon-to-water partitioning coefficient [K_{oc}]). Low water solubility and strong sorption to soil particles limit the relative importance of leaching through soil as a transport process. ~~And~~These characteristics cause PAHs to be relatively immobile.

Table 5-1
Estimates of Mobility[a] and Persistence of Selected Organic Compounds at Site 15

Analytes	K_{oc}[b] (L/kg)[c]	Low Percent Sorbed[d]	High Percent Sorbed[e]	Half-life in Soil[f] (in years)
Semivolatile Organic Compounds				
Benzo(a)pyrene	5.5E+06	100	100	1.45E+00
Dibenz(a,h)anthracene	3.3E+06	100	100	2.58E+00
Indeno(1,2,3-c,d)pyrene	~~1.6~~1.58E+06	99	100	2.0E+00
Polychlorinated Biphenyl				
Aroclor 1260	3.47E+05	97	100	4.1E+05

Sources:
~~Howard 1990~~
Howard et al. 1991
Mackay et al. 1992
U.S. EPA 1995

Notes:
[a] mobility proportional to percent sorbed: $K_{oc}f_{oc}/(1 + K_{oc}f_{oc}) \times 100$ (Karickhoff et al. 1979)
[b] K_{oc} – organic carbon-to-water partitioning coefficient (Mackay et al. 1992)
[c] L/kg – liters per kilogram
[d] based on a low total organic carbon fraction of 1.03E-04 for OU-3A soil data
[e] based on a high total organic carbon fraction of 6.13E-03 for OU-3A soil data
[f] the most conservative value cited in the reference is listed; half-life listed is for microbially mediated degradation in soil (Howard et al. 1991)

In the shallow soil, biodegradation is the most important transformation process affecting the persistence of PAHs. Another potentially important transformation process, photolysis, is limited to areas where surface soils are exposed to sunlight. The persistence of PAHs is due to their resistance to biodegradation. This resistance is proportional to molecular weight and the number of polar functional groups attached to the PAH aromatic ring structure. High-molecular-weight, multiringed PAHs that do not contain polar functional groups (e.g., pyrene) are the most resistant to biodegradation. As such, they remain in soils for significantly longer periods of time than lower-molecular-weight PAHs comprising fewer aromatic rings (e.g. naphthalene).

5.2.1.2 POLYCHLORINATED BIPHENYLS AND PESTICIDES

PCBs and pesticides were reported less extensively than PAHs. Pesticides were reported at several locations; PCBs were only reported in one location. The mobility of PCBs and pesticides is greatly affected by adsorption to organic matter in soil as detailed in Section 5 of the main report. These compounds have moderate to very high K_{oc} values, resulting in a strong affinity to the organic matter in the soil and relative immobility. PCBs and pesticides also resist transformation processes that can degrade some chemicals, causing them to be more persistent in the soil. As a result, these chemicals are found in shallow soils at Site 15.

5.2.2 Metals

Like organics, the transport of metals through the environment is strongly influenced by partitioning between soil and water. The partitioning is affected by the form in which a metal is present in solution, several soil properties, and a complex set of interactions between the metal in solution and soil. The partitioning behavior of a metal is expressed quantitatively as a distribution coefficient (K_d). ~~This is~~ discussed in detail in Section 5 of the main report. Table 5-2 addresses the mobility of selected metals identified in soil at Site 15. The K_d values presented in Table 5-2 for arsenic and manganese correspond to the range of soil pH and percent clay content reported for soils at MCAS El Toro. ~~A review of the analytical data and the site conditions suggests that metals above background in shallow soil are not likely to be leached downward through the soil profile at this site.~~ Mobility estimates based on these K_d values predict that a high percentage of the metals are sorbed to the soil, even those soil horizons containing a relatively low percentage of clay. This suggests that metals above background levels in the shallow soil are not likely to be leached downward through the soil profile at this site.

Table 5-2
Mobility[a] of Selected Metals at Site 15

Metals	K_d[b] (L/kg)[c] < 10 Percent[d] Clay	10 – 30 Percent Clay	> 30 Percent Clay	PERCENT SORBED < 10 Percent Clay	10 – 30 Percent Clay	> 30 Percent Clay
Arsenic	5.86	19.4	19.4	85	95	95
Manganese	16.5	25.3	36.9	94	96	97

Source:
Strenge and Peterson 1989

Notes:
[a] mobility is proportional to percent sorbed: $K_d/(1 + K_d) \times 100$
[b] K_d – distribution coefficient
[c] L/kg – liters per kilogram
[d] percent clay is total weight percent composition of the clay fraction including layered silicates, iron and aluminum oxyhydroxides, and organic matter

5.3 CONTAMINANT MIGRATION

The potential migration pathways from Site 15 are depicted on the conceptual model (Figure 5-1). The potential migration pathways relevant to this site include surface-water transport and fugitive-dust airborne transport. Infiltration is not considered a viable migration pathway at Site 15.

5.3.1 Surface-Water Transport

Surface-water runoff and sediment transport of contaminated soils may occur at Site 15, resulting in sediment transport to the street and surrounding areas. However, the impact to the local environment and the receiving waters from Site 15 is expected to be low for the following reasons:

- the extent of the soil contamination is small and restricted in depth;
- significant rainfall events producing overland flow and transport of sediment are infrequent (12.2 inches of annual rainfall generally over a 6-month period);
- equipment-washing activities on the concrete pad at Unit 2 generate water that drains to the ditch, but the volume of runoff is small and the impact is limited to the 2-foot-wide ditch area;
- the surface relief of Site 15 is generally flat, ranging from 0 to 3 percent slope; and
- the distribution of contamination at Site 15 does not support this pathway. (Surface water flows from northeast to southwest at Site 15, but the highest concentrations of chemicals are reported in a boring location in the northeast corner of the site.)

5.3.2 Atmospheric Transport

Contaminated surface soils are subject to mobilization by wind erosion and fugitive-dust transport. However, the stable condition of the surface in the area of the contaminated surface soils at Site 15 is expected to minimize the potential for mobilization of contaminants by this transport mechanism. Climatic conditions existing most of the year, coupled with the soil characteristics at the site, result in dry, stable, hard-ground surface soil in those areas of Site 15 not covered by concrete or metal matting. Light-to-moderate wind speeds in the region are generally insufficient to cause erosion or transport of contaminated soils.

Section 6
HUMAN-HEALTH RISK ASSESSMENT

This section briefly describes the approach used to estimate risk and summarizes the baseline risk assessment results for Site 15. In addition, a qualitative uncertainty evaluation identifies and characterizes the effects of uncertainties on the risk results. Supplementary information is presented in Appendix K.

Since Unit 1 was removed from the~~one~~ Phase II RI because of a petroleum exclusion, the~~one~~ risk assessment for Site 15 addresses only Unit 2~~,~~ (SWMU 273 and the Drainage Ditch) as an area of potential concern. Section 24 of this attachment contains a detailed discussion of the sampling locations, sampling rationale, and types of chemical analyses performed.~~,~~ ~~and~~ Results of the analyses are presented in Section 4.

The baseline risk assessment was conducted in accordance with the Phase II Risk Assessment Work Plan (BNI 1995c), the Technical Memorandum Revised Risk Assessment Procedures (BNI 1996b), and subsequent discussions with the California Environmental Protection Agency (Cal-EPA), Department of Toxic Substances Control, and U.S. EPA. The work plan and the Technical Memorandum Revised Risk Assessment Procedures follow the guidelines published by U.S. EPA in the Risk Assessment Guidance for Superfund: Part A (U.S. EPA 1989) and Part B (U.S. EPA 1991) and supporting documents and guidelines published by Cal-EPA (1992).

6.1 CHEMICALS OF POTENTIAL CONCERN

COPCs are the chemicals used to characterize the risk. This section identifies the chemicals selected as COPCs and identifies them for Unit 2 of Site 15. The frequency of detection, detection limits, and concentration range are presented in Appendix K. Section 6 of the main body of this report presents an overview of the data evaluation process used to select the COPCs for human health.

6.1.1 Soil Data

The identification of soil COPCs at the area of concern at Site 15 (Unit 2) was based on surface-soil data collected 0 to 2 feet bgs and shallow-soil data collected 0 to 10 feet bgs. Chemicals reported in soil samples more than 10 feet bgs are not included in the COPC list, because no exposure pathway is complete for these chemicals. Section 6.2 discusses the soil interval selection criteria.

Only Phase II RI data from samples collected within the site boundaries were used to identify the COPCs at the area of potential concern at Site 15. Information on the surface soils was obtained from 11 samples, whereas information on shallow soils was obtained from 34 samples. Soil sampling locations and associated samples used in the human-health risk assessment are listed in Table 6-1.

Twenty-six analytes were identified as surface-soil COPCs, and 29 analytes were identified as shallow-soil COPCs. All organic analytes identified in the surface soil were also present in the shallow soil. Soil concentrations of metal were statistically compared with background concentrations to identify site-related COPCs. The statistical approach

Table 6-1
Samples Used in the Risk Assessment for Site 15

Station ID	Sample ID	Date Collected
SURFACE SOIL (0 – 2 feet bgs*)		
Unit 2		
15B201	7900009	01/26/96
15B202	7900013	01/29/96
15B203	7900016	01/29/96
15B204	7900019	01/29/96
15B205	7900022	01/30/96
15B206	7900025	01/29/96
15B208	7900053	06/05/96
15B209	7900056	06/05/96
15B210	7900037	04/01/96
15B211	7900040	04/01/96
15B212	7900043	04/01/96
SHALLOW SOIL (0 – 10 feet bgs)		
Unit 2		
15B201	7900009	01/26/96
15B201	7900010	01/26/96
15B201	7900011	01/26/96
15B201	7900012	01/26/96
15B202	7900013	01/29/96
15B202	7900014	01/29/96
15B202	7900015	01/29/96
15B203	7900016	01/29/96
15B203	7900017	01/29/96
15B203	7900018	01/29/96
15B204	7900019	01/29/96
15B204	7900020	01/29/96
15B204	7900021	01/29/96
15B205	7900022	01/30/96
15B205	7900023	01/30/96
15B205	7900024	01/30/96
15B206	7900025	01/29/96
15B206	7900026	01/29/96
15B206	7900027	01/29/96
15B208	7900053	06/05/96
15B208	7900054	06/05/96

(table continues)

Table 6-1 (continued)

Station ID	Sample ID	Date Collected
15B208	7900055	06/05/96
15B209	7900056	06/05/96
15B209	7900057	06/05/96
15B209	7900058	06/05/96
15B210	7900037	04/01/96
15B210	7900038	04/01/96
15B210	7900039	04/01/96
15B211	7900040	04/01/96
15B211	7900041	04/01/96
15B211	7900042	04/01/96
15B212	7900043	04/01/96
15B212	7900044	04/01/96
15B212	7900045	04/01/96

Note:
* bgs – below ground surface

was based on a comparison of maximum reported on-site concentrations to the 95th percentile of the background data and use of the Wilcoxon Rank Sum test and the Quantile test to analyze the hypothesis that on-site concentrations are less than or equal to background concentrations (Appendix D) Thus, the metals selected were unique to each soil sample data set (i.e., silver was identified as a COPC for the shallow soil; however, it was not identified for the surface soil). Inorganic nutrients (calcium, iron, magnesium, potassium, and sodium) were excluded as COPCs. Table 6-2 presents the chemicals identified for each of the areas of potential concern. Analyses of soil samples did not produce any organic compounds classified as TICs.

6.1.2 Air Data

Conservatively, soil particulate COPCs were identified from soil samples. Appendix K presents the air modeling methodology.

6.2 EXPOSURE ASSESSMENT

An exposure assessment identifies the populations at potential risk and the mechanisms by which members of these populations could be exposed to the COPCs in each medium. It also is a process by which the chemical concentrations at the point of exposure and the chemical doses are calculated. Section 6 of the main body of this report describes the exposure scenarios, the hypothetical receptors, the methodology used to quantify exposure for each pathway, and the reasons for their selection. The following sections

Table 6-2
COPCs[a] Evaluated in the Risk Assessment for Site 15

Chemical	SHALLOW SOIL (0 – 10 feet bgs[b]) Unit 2	SURFACE SOIL (0 – 2 feet bgs) Unit 2
Semivolatile Organic Compounds		
Benz(a)anthracene	X	X
Benzo(a)pyrene	X	X
Benzo(b)fluoranthene	X	X
Benzo(g,h,i)perylene	X	X
Benzo(k)fluoranthene	X	X
Chrysene	X	X
Dibenz(a,h)anthracene	X	X
Fluoranthene	X	X
Indeno(1,2,3-c,d)pyrene	X	X
Pyrene	X	X
Pesticides and Polychlorinated Biphenyls		
4,4′-DDD[c]	X	X
4,4′-DDE[d]	X	X
4,4′-DDT[e]	X	X
alpha-chlordane	X	X
gamma-chlordane	X	X
Aroclor 1260	X	X
Endosulfan I	X	X
Metals		
Aluminum	X	
Antimony	X	X
Arsenic		X
Barium	X	
Cadmium		X
Chromium	X	X
Cobalt	X	X
Copper	X	X
Lead	X	X
Manganese	X	
Nickel	X	X
Silver	X	
Vanadium	X	
Zinc	X	X

(table continues)

Table 6-2 (continued)

Notes:
[a] COPC – chemical of potential concern
[b] bgs – below ground surface
[c] DDD – dichlorodiphenyldichloroethane
[d] DDE – dichlorodiphenyldichloroethene
[e] DDT – dichlorodiphenyltrichloroethane

describe the exposure setting at Site 15, identify the hypothetical receptors for the site, and discuss the exposure-point concentrations for the COPCs at each area of potential concern.

6.2.1 Receptor Analysis

MCAS El Toro is currently being used as a military air base, and its land use can be classified as industrial. Site 15 is a fenced enclosure located in the western portion of MCAS El Toro, north of Building 31, West Marine Way. Unit 2 is located immediately behind Building 31 and includes an area covered by metal matting, a concrete pad, a drainage area that flows southwest from the concrete pad, and a bare soil area between the drainage area and Building 31. For the Phase I and II RI, the site was subdivided into two units (Units 1 and 2). Unit 1 is not addressed by this risk assessment because it was removed from the site through the CERCLA petroleum exclusion; therefore, Unit 2 is considered to be the only area of potential concern.

For Site 15, the most likely population at risk under current conditions was identified as base personnel. However, as presented in Section 6 in the main body of this report, MCAS El Toro as part of BRAC will be closed in 1999.~~will be turned over to Orange County following closure.~~ Draft reuse plans have been formulated and indicate that the Station will remain an airport. To provide risk managers with a margin of safety when making cleanup decisions, exposure conditions used in the estimation of current and future risk were deliberately chosen to overestimate risk. Risk was evaluated for Site 15 using industrial and residential land-use scenarios, even if the residential use is considered unlikely even in the distant future.

The industrial worker risk scenario allows the assessment of risk due to exposure to COPCs in surface soil. The resident risk scenario allows the assessment of risk due to exposure to COPCs in shallow soil. Exposure for these two potential receptors (industrial workers and residents) was assessed as being greater than for any other potential receptor. These receptors were considered more of a possibility than individuals exposed occasionally or irregularly to chemicals at a site (i.e., someone engaged in the construction of buildings and other structures). Therefore, risks to the industrial worker and the resident were the only risks quantified.

6.2.2 Exposure Pathways

Exposure pathways are the means by which a receptor can come into contact with the COPCs. Pathway identification is based on information corresponding to land use and the physical properties of the COPCs. Section 6 of the main body of this report identifies the exposure pathways evaluated for the residential and industrial receptors at the OU-3A sites along with the scenarios upon which the exposure pathways for each receptor are based.

6.2.3 Exposure-Point Concentration

An exposure-point concentration is the concentration of a chemical in the contaminated medium at the point of contact with a receptor. Chemical concentrations reported in surface soil (0 to 2 feet bgs) were used for the office worker because it is unlikely that routine daily activities of that receptor would result in exposure to chemicals in deeper soil. For the resident, chemical concentrations reported in shallow soil down to 10 feet bgs were used in the estimation of exposure-point concentrations.

Following the criteria described in Section 6 of the main body of this report, both 95 percent upper confidence limits (UCLs) and maximum concentrations were used as exposure-point concentrations for the COPCs in surface and shallow soil at the area of potential concern, Unit 2. The procedure for calculating an exposure-point concentration tends to use the maximum reported concentration in cases of relatively few samples or low frequency of detection. Appendix K describes the procedures used to calculate the 95 percent UCLs and identifies the exposure-point concentration and the statistical distribution of each chemical.

Some of the Site 15 chemicals identified as COPCs (metals, PAHs, and pesticides) were also reported in background or reference samples. Metals are natural components of the earth's crust. Pesticides, such as DDT, DDE, and DDD are found throughout the United States because of their past and present widespread use. PAHs are encountered in the soils of industrial areas, and their presence has been reported in surface soils in the vicinity of vehicular traffic. The background study for MCAS El Toro (BNI 1996c) presents the metals and pesticides identified at the background or reference locations and their measured concentrations. The PAH reference-level study performed for soils at MCAS El Toro under CTO-0065 (BNI 1996d) was used to identify reference concentrations for the PAHs.

For these chemicals, a comparison between their on-site and background or reference levels provides additional information to be used by risk managers in reaching site-specific decisions. Appendix K presents the exposure-point concentrations for background metals, PAHs, and pesticides. The 95 percent UCL or the maximum concentration, as appropriate, was used as the exposure-point concentration for metal, PAH, and pesticide COPCs measured in soil background or reference

6.2.4 Estimation of Dose Rate

Dose rate is the amount of chemical to which a receptor is exposed per unit of body weight and time. Dose rates were estimated by integrating intake variables (e.g., ingestion rate, body weight, and exposure duration) with the contaminant concentration. The combination of all intake variables results in an estimate of exposure for each pathway. The specific equations for each exposure scenario and the values assigned to the equation parameters are provided in Appendix K. Exposure assumptions describing the rate of contact that the industrial and residential receptors could have with the soil are presented in Section 6 of the main body of this report.

6.3 TOXICITY ASSESSMENT

The toxicity assessment consisted of identifying oral and inhalation toxicity criteria (cancer slope factors [CSFs] and reference doses [RfDs]) for each of the chemicals chosen for inclusion in the risk assessment and the kinds of effects these chemicals are capable of producing. The toxicity factors are combined with the chronic daily dose to calculate a numerical estimate of risk (Section 6.4 of the main report). Section 6 of the main report presents the source of toxicity criteria, identifies toxicity values developed by Cal-EPA for a group of eight carcinogens, and identifies the toxicity criteria used for dermal exposures. Toxicity criteria for the COPCs identified for the OU-3A sites at MCAS El Toro and the chemicals without toxicity criteria and their chemical surrogates are tabulated in Appendix K.

The assessment of the risk presented by lead consisted of first comparing the concentration of lead in surface and shallow soils at the areas of potential concern of Site 15 to the industrial and residential Cal-EPA PRG of 1,000 and 130 mg/kg, respectively. For the shallow soils, the comparison is based on the residential Cal-EPA PRG instead of the U.S. EPA PRG (400 mg/kg), because the Cal-EPA PRG is lower and more stringent, rendering the approach conservative. The Cal-EPA industrial soil PRG for lead is exceeded at Unit 2; therefore, the Cal-EPA pharmacokinetic model is utilized, and the blood lead concentration is compared to the acceptable concentration of 10 micrograms per deciliter (µg/dL). Section 6.4 summarizes the blood lead-level concentrations resulting from exposure to lead in shallow soils at Unit 2.

Upon completion of a risk assessment, it is not uncommon to find that only a small percentage of the chemicals evaluated contribute appreciably to total risk. Those chemicals are conventionally called risk drivers. In this risk assessment, risk and hazard drivers are defined as COPCs that present a cancer risk of at least 1×10^{-6} or an HI of at least 1.0. COPCs with cancer risk estimates less than 1×10^{-6} or HIs less than 1.0 are also classified as risk/hazard drivers when the sum of their risk estimates or HIs exceeds 1×10^{-6} or 1.0, respectively. The risk drivers at Site 15 include Aroclor 1260, arsenic, benzo(a)pyrene, dibenz(a,h)anthracene, and manganese. Appendix K presents the Integrated Risk Information System files for the COPCs identified as risk drivers. Information about the receptors and pathways through which the risk drivers posed the highest risk are presented in the next section.

6.4 RISK CHARACTERIZATION

The final step in any risk assessment is the characterization of risk in which the exposure and toxicity information generated in previous sections is integrated to evaluate the potential health risks. The methods used in the estimation of risk are presented in Section 6 of the main body of this report. The following text provides the resultant risk estimates, summarized in Tables 6-3 and 6-4, for the industrial and residential receptors, respectively. In addition, the text identifies the COPCs (risk drivers) accounting for most or all of the total cancer and noncancer risk.

For the carcinogens, two estimates of cancer risk are given for each receptor, as shown in Figure 6-1. The first estimate is based exclusively on U.S. EPA CSFs, and the second is based on U.S. EPA CSFs with Cal-EPA CSFs substituted for certain chemicals (see Section 6 of the main report). Note that both risk estimates are presented even though the COPCs at an area of potential concern may not include any of the eight chemicals for which a Cal-EPA CSF has been assigned. In such cases, the two estimates of total cancer risk are identical.

For the resident, the cancer risk for the adult resident is estimated to be higher than that for the child resident. Therefore, to simplify the presentation of the results, this section is limited to the discussion of the adult cancer risks (Table 6-4). Appendix K presents the cancer risks quantified for both residential receptors. Figure 6-2 illustrates the risk associated with each on-site exposure pathway. Figure 6-3 shows the COPCs identified as risk drivers at Site 15.

The results of the industrial worker and residential noncancer risk (HI) and the hazard evaluation of lead are also presented in this section. For the resident receptor, noncancer risk estimates discussed in the text are the higher of the child or the adult estimate (the noncancer risk estimates for the child resident are higher than those for the adult resident). Appendix K presents the noncancer risks quantified for both residential receptors. Figure 6-4 presents the HI for each receptor at Site 15. Figure 6-5 illustrates the HI associated with each exposure pathway. Figure 6-6 shows the COPCs contributing to the majority of the HI.

A limitation of the HI is that the assumption of dose additivity is most properly applied to compounds that induce the same effect by the same mechanism of action. Consequently, the HI could be overestimated by a cumulative HI due to a number of chemicals that are not expected to induce the same type of effect. Thus, for the HIs exceeding unity (Unit 2 under the residential land use scenario), COPCs were segregated by effect, and separate HIs were derived specific to each effect group (Table 6-5).

Table 6-3
Summary of Cancer Risk and Chronic Hazard Index, Industrial Use

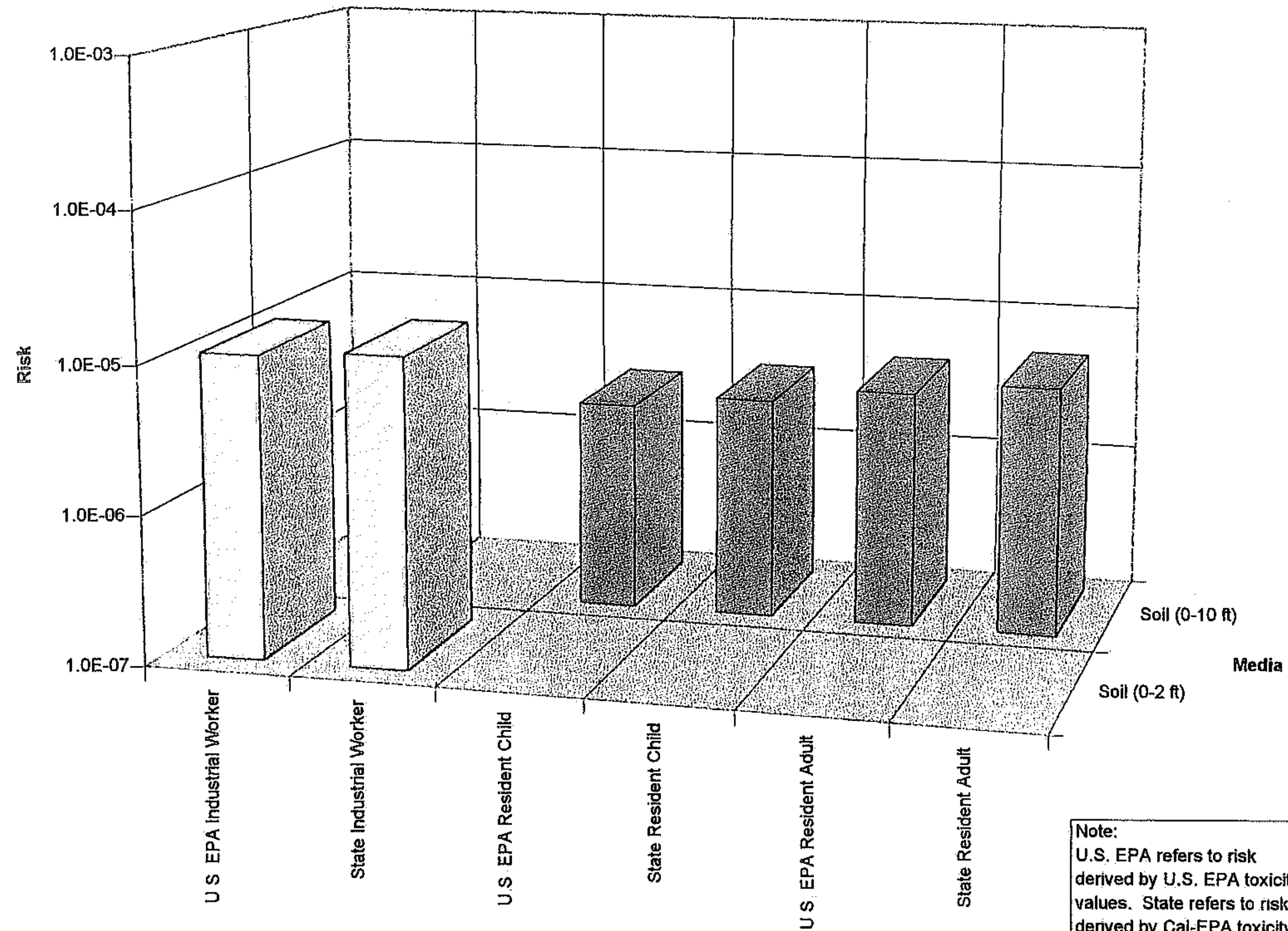
Exposure Pathway	Cancer Risk U.S. EPA[a,b]	Cancer Risk California State[b]	Hazard Index
Unit 2			
Incidental dermal contact	9.1E-06	9.6E-06	0.079
Dust inhalation	2.2E-07	3.8E-07	0.00093
Incidental ingestion	2.1E-06	2.2E-06	0.041
Vapor inhalation	NA[c,d]	NA[d]	NA[d]
Unit 2 Total	**1.1E-05[e]**	**1.2E-05[f]**	**0.12**

Notes:
- [a] U.S. EPA – United States Environmental Protection Agency
- [b] risk was calculated by using U.S. EPA or California Environmental Protection Agency toxicity values
- [c] NA – not applicable
- [d] risk was not quantifiable; volatile organic compounds were not analyzed for at this site
- [e] the majority of the risk is due to dermal contact and incidental ingestion of arsenic (70 percent) and dermal contact and incidental ingestion of dibenz(a,h)anthracene (10 percent)
- [f] the majority of the risk is due to dermal contact and incidental ingestion of arsenic (64 percent), dermal contact and incidental ingestion of benzo(a)pyrene (11 percent), and dermal contact and incidental ingestion of dibenz(a,h)anthracene (9 percent)

Table 6-4
Summary of Cancer Risk and Chronic Hazard Index, Residential Use

Exposure Pathway	Cancer Risk U.S. EPA[a,b]	Cancer Risk California State[b,c]	Hazard Index[d]
Unit 2			
Incidental dermal contact	2.6E-06	3.2E-06	0.073
Dust inhalation	6.2E-09	6.2E-08	0.54
Incidental ingestion	1.5E-06	1.9E-06	0.44
Vapor inhalation	NA[e,f]	NA[f]	NA[f]
Unit 2 Total	**4.2E-06[g]**	**5.1E-06[h]**	**1.1[i]**

Notes:
- [a] U.S. EPA – United States Environmental Protection Agency
- [b] risk was calculated by using U.S. EPA or California Environmental Protection Agency toxicity values
- [c] the risk is higher for the resident adult; therefore, only the resident adult risk results are shown
- [d] the index is higher for the resident child; therefore, only the resident child indices are shown
- [e] NA – not applicable
- [f] risk was not quantifiable; volatile organic compounds were not analyzed for at this site
- [g] the majority of the risk is due to dermal contact and incidental ingestion of dibenz(a,h)anthracene (40 percent), dermal contact and incidental ingestion of benzo(a)pyrene (29 percent), and dermal contact and incidental ingestion of Aroclor 1260 (24 percent)
- [h] the majority of the risk is due to dermal contact and incidental ingestion of benzo(a)pyrene (37 percent), dermal contact and incidental ingestion of dibenz(a,h)anthracene (33 percent), and dermal contact and incidental ingestion of Aroclor 1260 (20 percent)
- [i] the majority of the index is due to dust inhalation and incidental ingestion of manganese (54 percent)



Note:
U.S. EPA refers to risk derived by U.S. EPA toxicity values. State refers to risk derived by Cal-EPA toxicity values.

Figure 6-1
Summary of Lifetime Cancer Risk Estimates by Receptor at Site 15

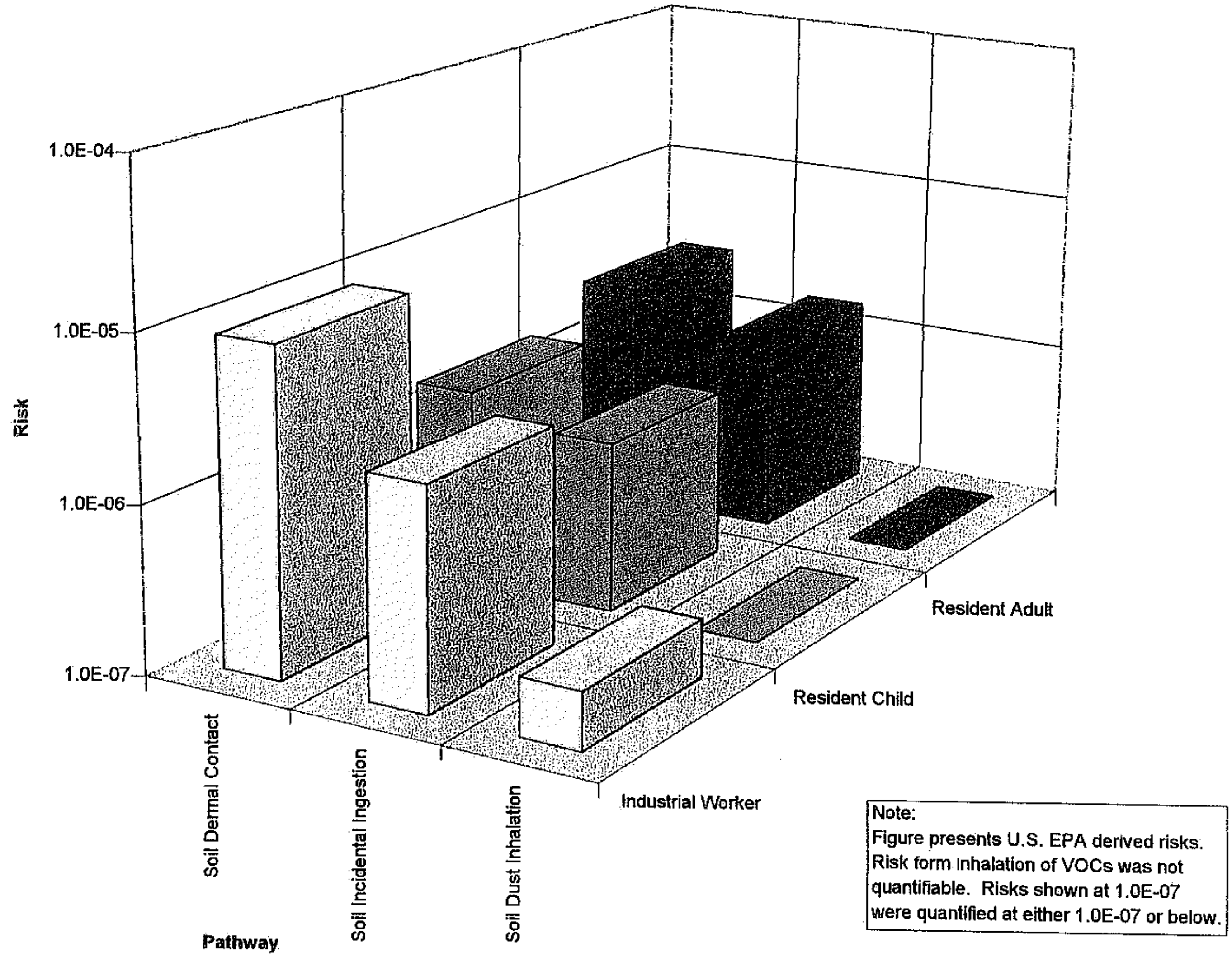


Figure 6-2
Summary of Carcinogenic Risk by Pathway at Site 15

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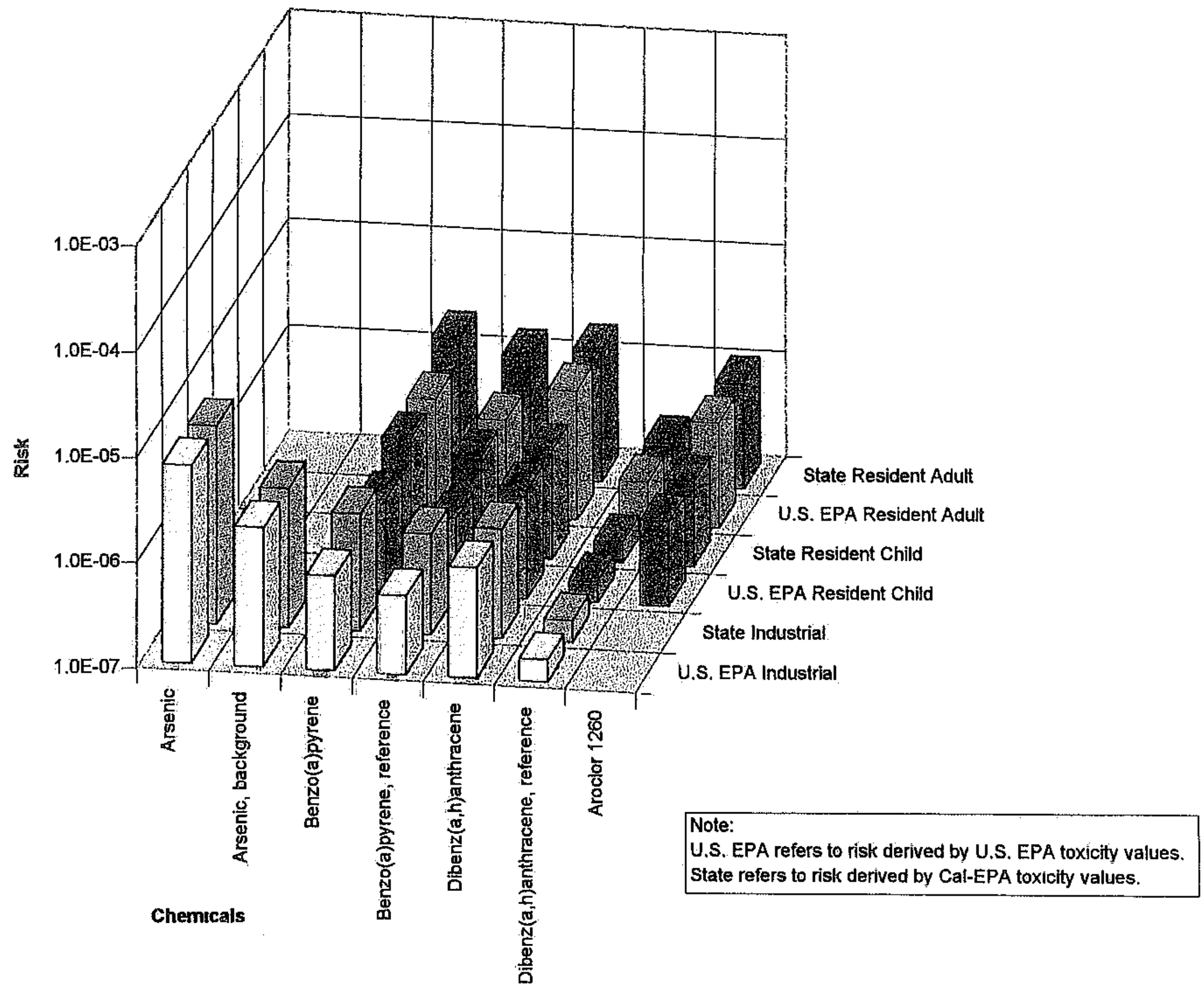

Figure 6-3
Lifetime Cancer Risks of the Risk Drivers for Soils at Site 15

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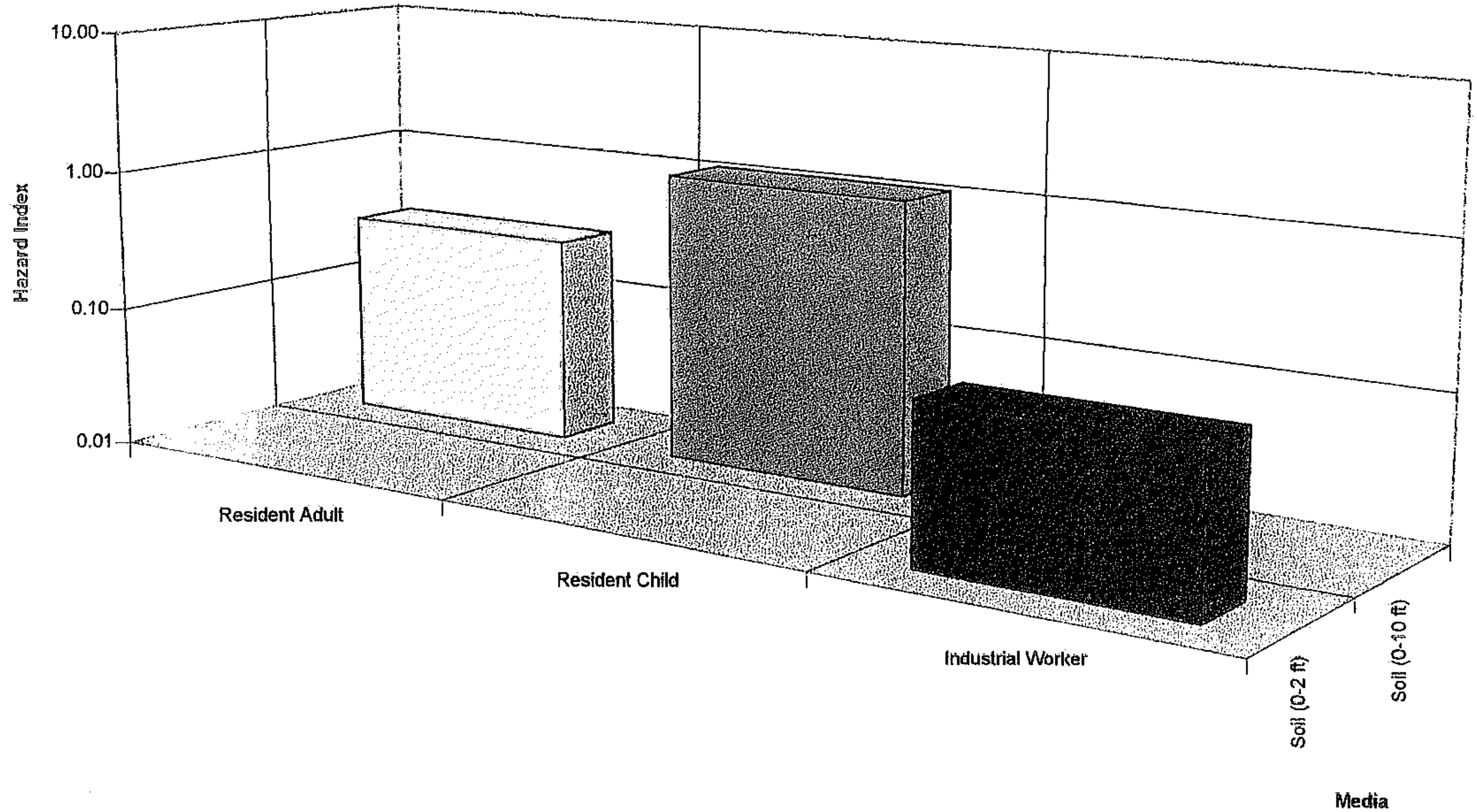

Figure 6-4
Chronic Hazard Index by Receptor at Site 15

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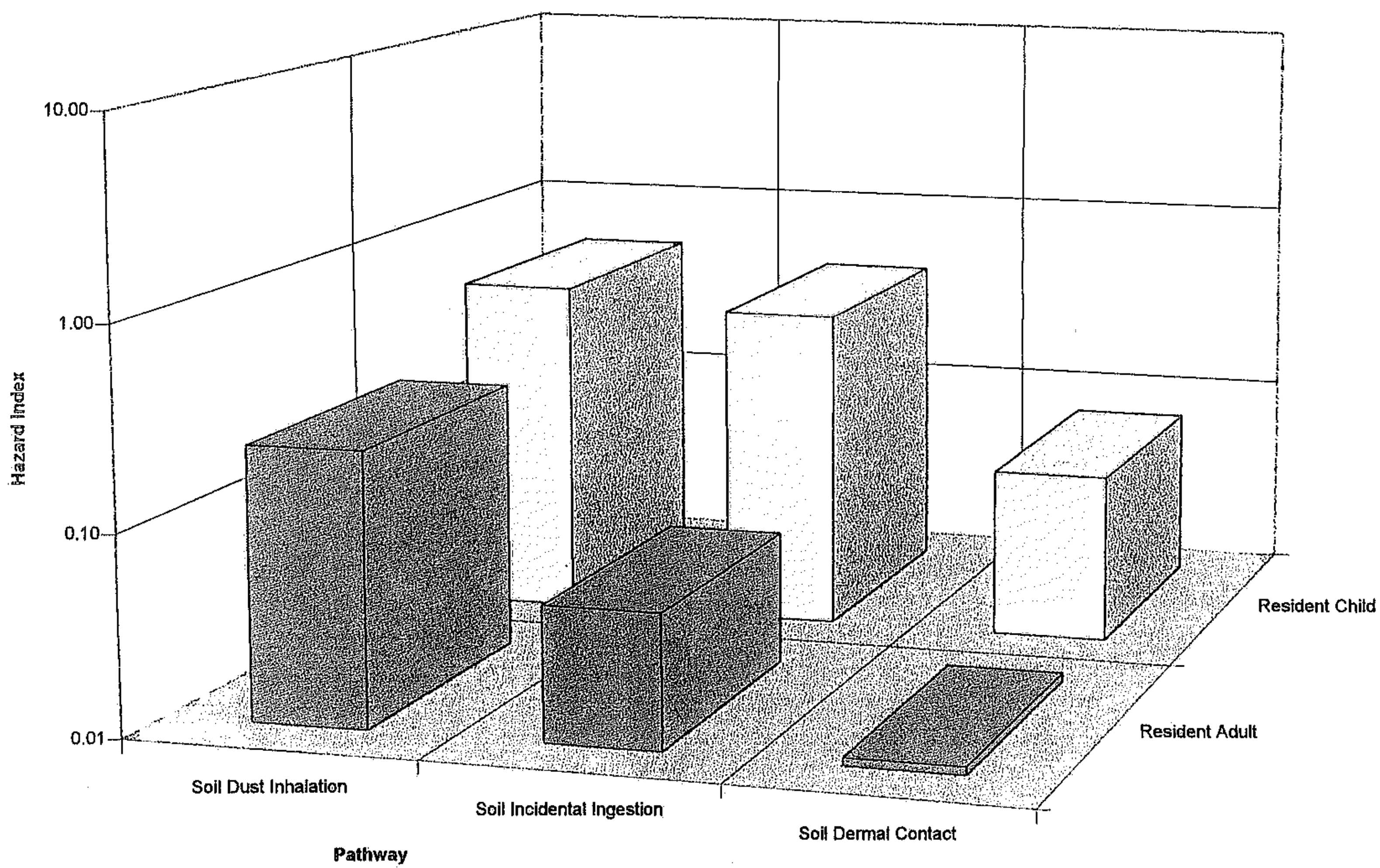

Note:
Hazard Index for the Resident Adult and Industrial Worker is less than 1.0

Figure 6-5
Chronic Hazard Index by Pathway at Site 15

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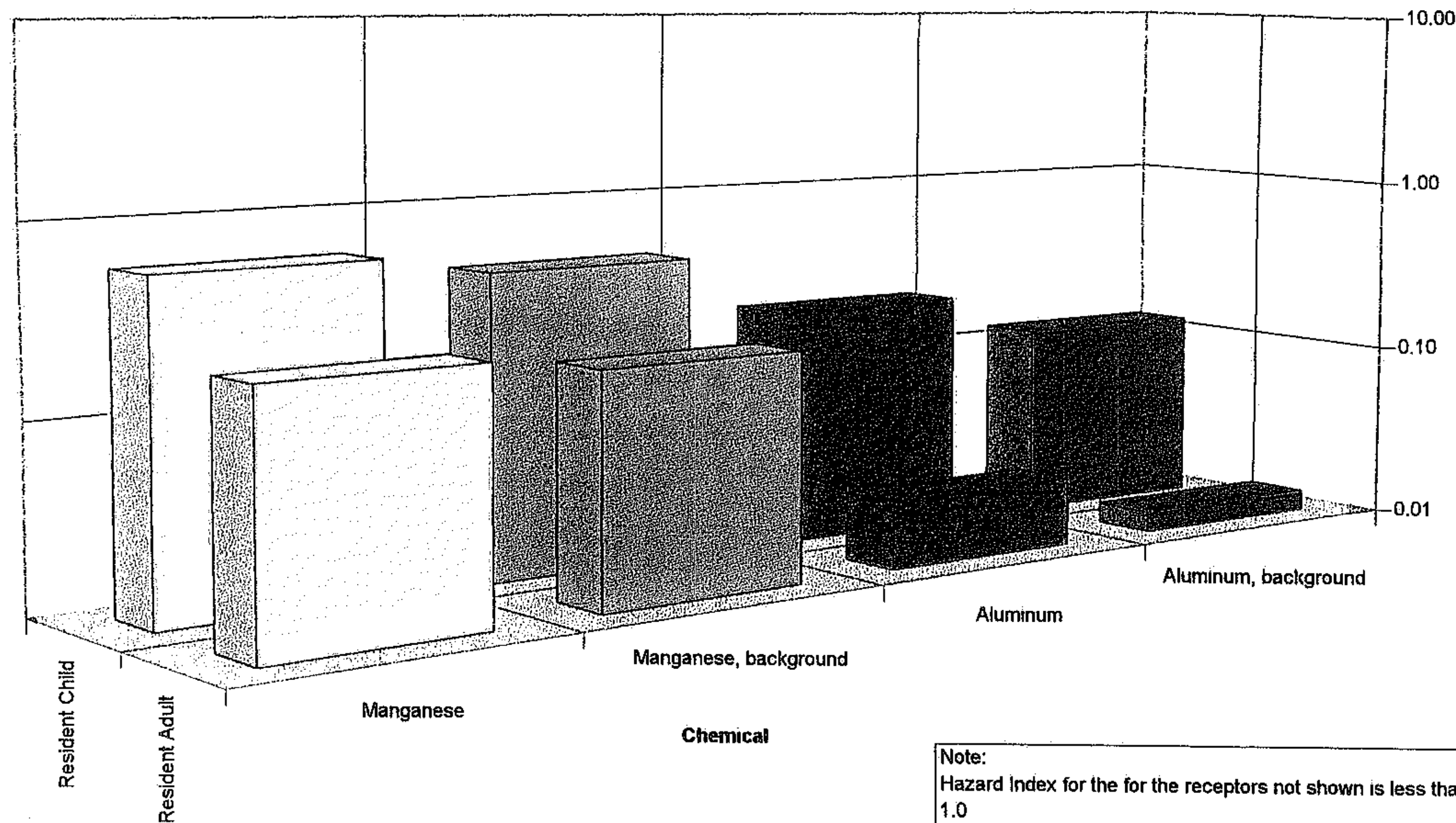

Note:
Hazard Index for the for the receptors not shown is less than 1.0
Aluminum is not considered a risk driver, but is included for comparison.

Figure 6-6
Hazard Indices of the Risk Drivers for Soil at Site 15

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6.4.1 Industrial Use

The excess lifetime cancer risk to an industrial worker exposed to surface soils (0 to 2 feet bgs) at Unit 2 was estimated at 1.1×10^{-5} and 1.2×10^{-5} using U.S. EPA and Cal-EPA toxicity criteria, respectively. Dermal contact is the dominant risk pathway (Table 6-3). When based on U.S. EPA toxicity values, arsenic and dibenz(a,h)anthracene are the main contributors to the soil risk. In addition to these chemicals, benzo(a)pyrene is identified as a primary risk contributor subsequent to the replacement of U.S. EPA CSFs with Cal-EPA CSFs (Cal-EPA derived risk). Arsenic is classified by the U.S. EPA as a human carcinogen (Group A), which means that there is sufficient evidence to show that it causes cancer in humans. The other two chemicals are classified by the U.S. EPA as probable human carcinogens (Group B2), which means that there is sufficient evidence that both are carcinogenic in laboratory animals, but there is insufficient evidence of carcinogenicity in humans.

For additional perspective, a background or reference cancer risk was also estimated for the naturally occurring metals and anthropogenic chemicals (i.e., PAHs and pesticides) identified as COPCs at each area of potential concern. A comparison between on-site and background or reference level risks provides useful information to risk managers in the context of decisions to be made about selection of remedies. The cancer risk from arsenic is approximately four times higher on-site than at background. The cancer risk from dibenz(a,h)anthracene and benzo(a)pyrene is approximately 7 and 1.4 times higher, respectively, on-site than at reference levels. Appendix K presents the risk estimates quantified for all metal and anthropogenic COPCs reported at background locations. The HI at this area is less than 1.0, indicating that systemic toxicity is unlikely. Because the Cal-EPA industrial soil PRG for lead (1,000 mg/kg) is exceeded at this area of potential concern (1,160 mg/kg), the Cal-EPA pharmacokinetic model was utilized to estimate the blood lead concentration for an industrial worker exposed to lead in the surface soil at Unit 2 of Site 15. Unlike the other COPCs, lead was evaluated by comparing the calculated concentration (50th, 90th, 95th, 98th, and 99th percentile) with the benchmark of 10 µg/dL, which has been established by U.S. EPA as a level below which the most serious effects of lead are unlikely to occur. The estimated concentrations of lead in the blood of the industrial worker did not exceed the threshold value of 10 µg/dL, indicating that potential adverse health effects from exposure to lead concentrations at Unit 2 of Site 15 are unlikely.

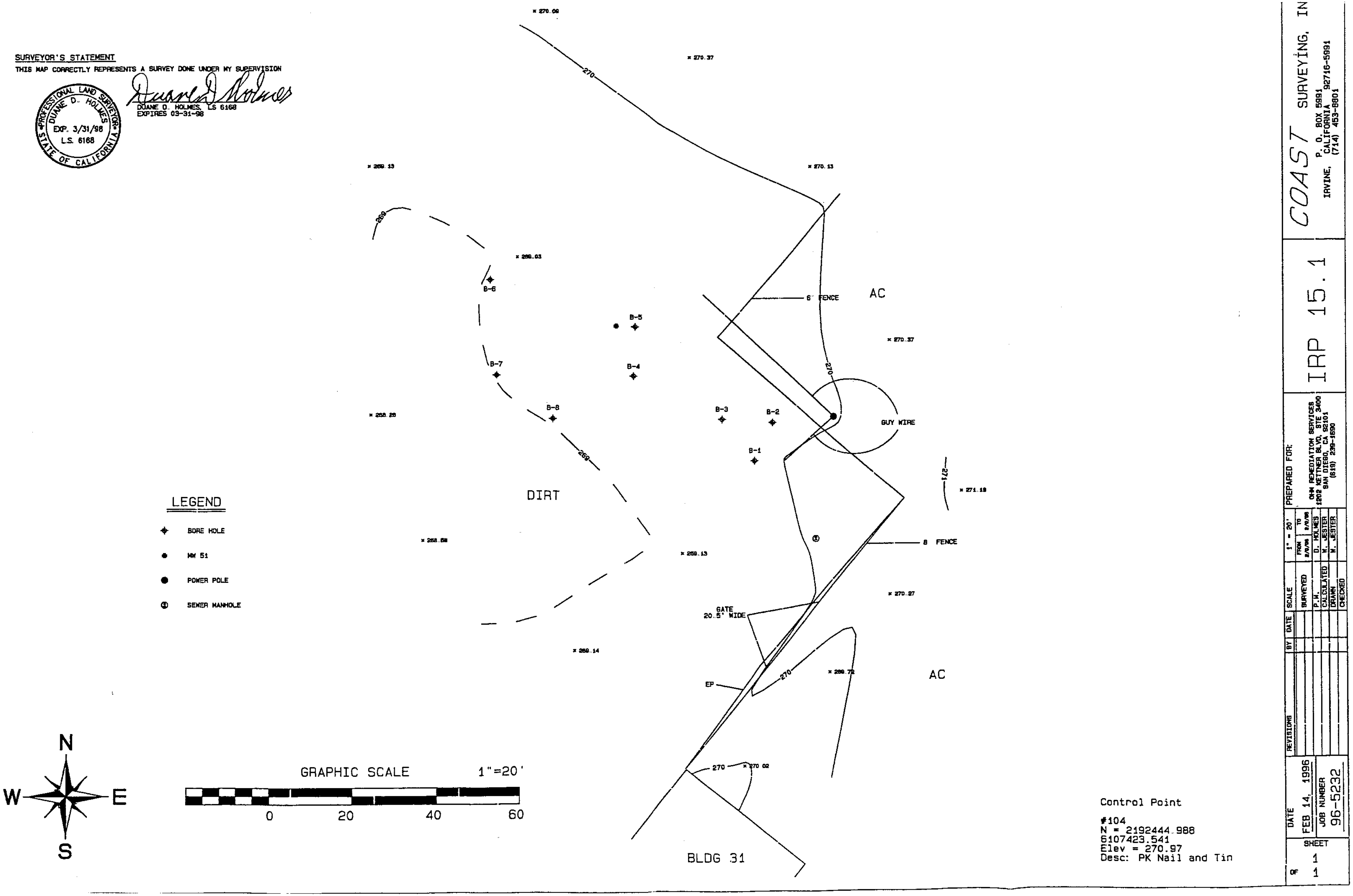
6.4.2 Residential Use

Exposure to shallow soils (0 to 10 feet bgs) at Unit 2 by a hypothetical resident resulted in an excess lifetime cancer risk estimated at 4.2×10^{-6} and 5.1×10^{-6} by use of U.S. EPA and Cal-EPA toxicity criteria, respectively. Dermal contact is the dominant risk pathway (Table 6-4). The risk at this area is primarily associated with dibenz(a,h)anthracene, benzo(a)pyrene, and Aroclor 1260. The cancer risk due to dibenz(a,h)anthracene and

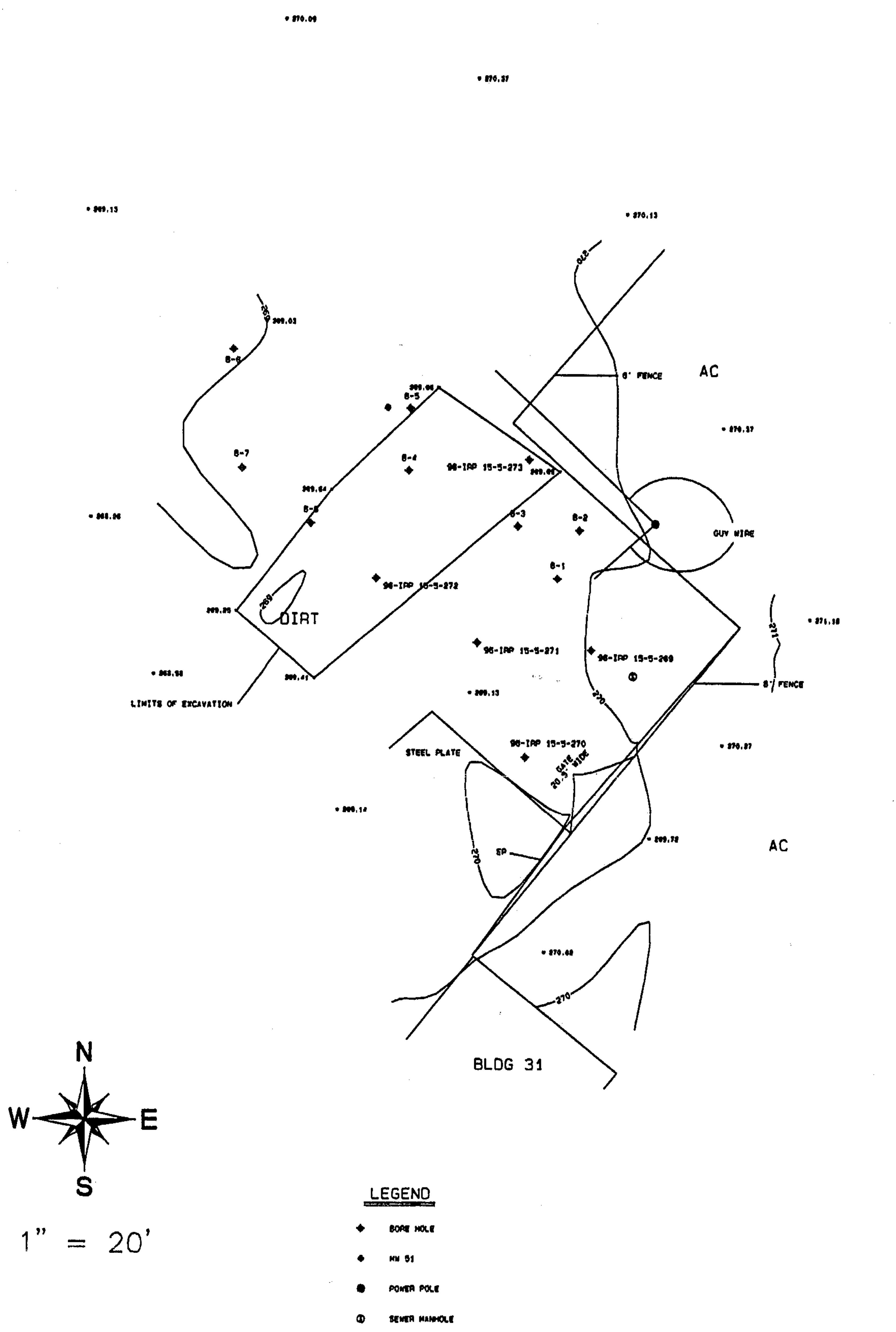
Table 6-5
Chronic Hazard by Specific Effect
Site 15 Unit 2 Residential Use

Chemical	Kidney Toxicity	Liver Toxicity	Neurotoxicity Effects	Dermal Effects	Respiratory Effects	Hematological Effects	Cardiovascular Effects	Gastrointestinal Effects	Ocular Effects	Reproductive Effects	Developmental Effects	Immunological Effects	Hazard Quotient for All Effects
Unit 2													
Aluminum	—[a]	—	2.10E-01	—	2.10E-01	—	—	—	—	2.10E-01	—	—	2.10E-01
Antimony and compounds	3.40E-02	—	—	—	3.40E-02	3.40E-02	3.40E-02	—	—	3.40E-02	—	—	3.40E-02
Aroclor 1260	—	5.00E-02	—	—	—	—	—	5.00E-02	—	—	—	—	5.00E-02
Barium and compounds	—	—	6.20E-02	—	6.20E-02	—	6.20E-02	6.20E-02	—	6.20E-02	6.20E-02	—	6.20E-02
alpha-chlordane	—	4.70E-04	4.70E-04	—	—	—	—	4.70E-04	—	—	—	—	4.70E-04
gamma-chlordane	—	5.50E-04	5.50E-04	—	—	—	—	5.50E-04	—	—	—	—	5.50E-04
Chromium III and compounds	—	—	—	—	—	—	—	—	—	—	2.70E-04	—	2.70E-04
Chrysene	—	—	—	—	—	—	—	—	—	—	—	5.00E-05	5.00E-05
Cobalt	—	—	—	2.60E-03	2.60E-03	—	—	—	—	—	—	—	2.60E-03
Copper and compounds	4.40E-03	4.40E-03	4.40E-03	—	4.40E-03	4.40E-03	4.40E-03	4.40E-03	4.40E-03	4.40E-03	4.40E-03	—	4.40E-03
4,4′-DDD[b]	—	1.30E-04	—	—	—	—	—	—	—	—	—	—	1.30E-04
4,4′-DDE[c]	—	1.10E-04	—	—	—	—	—	—	—	—	—	—	1.10E-04
4,4′-DDT[d]	—	2.60E-04	—	—	—	—	—	—	—	—	—	—	2.60E-04
Fluoranthene	1.10E-04	1.10E-04	—	—	—	1.10E-04	—	—	—	—	—	—	1.10E-04
Manganese and compounds	—	—	5.90E-01	—	5.90E-01	5.90E-01	—	5.90E-01	—	5.90E-01	—	5.90E-01	5.90E-01
Nickel and compounds	7.10E-03	—	—	7.10E-03	7.10E-03	7.10E-03	7.10E-03	7.10E-03	—	7.10E-03	—	—	7.10E-03
Pyrene	1.20E-04	1.20E-04	—	—	—	1.20E-04	—	—	—	—	—	—	1.20E-04
Silver and compounds	1.80E-03	—	1.80E-03	1.80E-03	1.80E-03	—	1.80E-03	1.80E-03	1.80E-03	—	—	—	1.80E-03
Vanadium	8.40E-02	8.40E-02	8.40E-02	—	8.40E-02	8.40E-02	—	8.40E-02	—	—	—	—	8.40E-02
Zinc	4.50E-03	—	—	4.50E-03	4.50E-03	4.50E-03	—	4.50E-03	—	4.50E-03	4.50E-03	4.50E-03	4.50E-03
Cumulative Effect Total	**1.36~~03~~E-01**	**1.40E-01**	**9.53E-01**	**1.60E-02**	**1.00E+00 ~~9.66E-01~~**	**7.24E-01**	**1.09E-01 ~~7.58E-02~~**	**8.05~~8.07~~E-01**	**6.20E-03 ~~1.24E-02~~**	**9.12~~8.78~~E-01**	**7.12E-02**	**5.95E-01**	**1.05~~1.1~~E+00**

Notes:
- [a] — – not analyzed
- [b] DDD – dichlorodiphenyldichloroethane
- [c] DDE – dichlorodiphenyldichloroethylene
- [d] DDT – dichlorodiphenyltrichloroethane



SURVEYOR'S STATEMENT
THIS MAP CORRECTLY REPRESENTS A SURVEY DONE UNDER MY SUPERVISION
Duane D. Holmes
DUANE D. HOLMES, LS 6168
EXPIRES 03-31-98
PROFESSIONAL LAND SURVEYOR
DUANE D. HOLMES
EXP. 3/31/98
L.S. 6168
STATE OF CALIFORNIA
LEGEND
BORE HOLE
MW 51
POWER POLE
SEWER MANHOLE
B-1
B-2
B-3
B-4
B-5
B-6
B-7
B-8
DIRT
AC
AC
6' FENCE
8' FENCE
GUY WIRE
GATE
20.5' WIDE
EP
BLDG 31
270
269
271
GRAPHIC SCALE
1"=20'
0
20
40
60
N
S
E
W
Control Point
#104
N = 2192444.988
E107423.541
Elev = 270.97
Desc: PK Nail and Tin
COAST SURVEYING, INC
P. O. BOX 5991
IRVINE, CALIFORNIA 92716-5991
(714) 453-8801
IRP 15.1
PREPARED FOR:
OHM REMEDIATION SERVICES
1202 KETTNER BLVD, STE 3400
SAN DIEGO, CA 92101
(619) 239-1690
REVISIONS
BY
DATE
SCALE
1" = 20'
SURVEYED
P.M.
D. HOLMES
CALCULATED
W. JESTER
DRAWN
W. JESTER
CHECKED
DATE
FEB 14, 1996
JOB NUMBER
96-5232
SHEET
1
OF 1



Control Point

#104
N = 2192444.988
6107423.541
Elev = 270.97
Desc: PK Nail and Tin

IRP_151.DWG

SHEET 1	DATE 4/1/96	P.M.	D. HOLMES	IRP 15.1
		CALCULATED	W. JESTER	
OF 1	JOB NUMBER 96-5232	DRAWN	W. JESTER	
		CHECKED	D. HOLMES	

15405 Redhill Avenue, Suite A
Tustin, CA. 92680
(714) 556-9280

benzo(a)pyrene at Unit 2 is approximately 7 and 1.4 times higher, respectively, than at reference levels There is no reference level for Aroclor 1260.

The HI for a hypothetical resident child exposed to shallow soils at Unit 2 is 1.1. Dust inhalation was the dominant noncancer risk pathway. The majority of the HI is due to manganese. However, as presented in Table 6-5, segregation of the HI by major systemic effects resulted in HIs less than 1.0, indicating that systemic toxicity is unlikely. The HI for manganese at Unit 2 is approximately 1.3 times its HI at background. The risk for lead is considered negligible based on a comparison of the Cal-EPA residential PRG for lead (130 mg/kg) and the 95 percent UCL for lead (20.5 mg/kg) at the shallow soil of Site 15, Unit 2.

6.4.3 Discussion

For future industrial workers at Site 15 Unit 2, cancer risk was quantified at 1.1E-05 and the cumulative HI is less than 1.0. Cancer risk for future residents at this unit is 4.2E-06 and the cumulative HI is greater than 1.0. The respiratory system was the only toxic endpoint with an HI greater than 1.0 under the residential scenario, due primarily to manganese (54 percent). However, the HI for manganese at Unit 2 is only 1.3 times its HI at background. This indicates that the concentrations of manganese are not significantly different from background at Site 15 Unit 2. Therefore, noncancer hazards at this unit are not considered significant.

Individuals engaged in construction work were also evaluated for selection as representative receptors. The construction worker is potentially exposed to the same 0- to 10-foot-bgs shallow-soil interval as the on-site resident. Long-term exposure for residents at the site is assessed as being greater than exposure for someone performing construction work over a short time. Construction work would be infrequent and its duration is assumed to be 1 year or less. Furthermore, excavation activities would be covered by regulations promulgated by the California Occupational Safety and Health Administration and incidental exposure to chemicals in the soil is unlikely. Therefore, risks to the hypothetical site resident were quantified while risks to the utility maintenance worker were qualitatively assessed.

Cancer risk to a 70-kg construction worker with an exposed skin surface area of 5,000 square centimeters, a soil ingestion rate of 480 mg/day, an inhalation rate of 1.25 cubic meters/hour, an exposure duration of 1 year, and an exposure frequency of 250 days would be quantified at least 7 times less than the risk to the resident adult. Noncancer risk to a 70-kg construction worker would be quantified at least 10 times less than the risk to the resident child.

The area of Site 15 Unit 2 is partially paved. Paved areas were conservatively treated as being entirely unpaved. The receptors were assumed to be exposed to COPCs in soil by soil ingestion, dermal contact with soil, and inhalation of particulates and vapors everywhere on the site. This assumption overestimates the risk under paved conditions. Pavement prevents direct skin contact with and ingestion of the soil as well as the generation of dust. In addition, it is difficult to estimate the emission rate of volatile chemicals through pavement.

To place the cancer and noncancer risk estimates in proper perspective, the data and the context in which they were used to calculate these estimates~~inherent uncertainties in the numerical results~~ must be evaluated. ~~The frequency of detection (number of measurable detections/number of samples analyzed) was generally low to moderately low for the organic COPCs and high for the inorganic COPCs in both surface and shallow soil.~~ Of particular interest are the organic cancer risk drivers, dibenz(a,h)anthracene, benzo(a)pyrene, and Aroclor 1260. These COPCs were reported in only two or three samples at the surface, which conveys to the use of the maximum reported value as the exposure-point concentration for both surface and shallow soil (0.055 mg/kg for dibenz[a,h]anthracene at sampling station 15B210; 0.038NJ mg/kg for benzo[a]pyrene at station 15B204; and 0.031J mg/kg for Aroclor 1260 at station 15B201). Several other COPCs were similarly evaluated on the basis of highest measured concentrations. It is important to note that the assumption of long-term contact with the maximum concentration is conservative, and the use of maximum concentrations in the risk assessment results in overestimates of exposures and risks. Section 6 of the main report presents the major uncertainties associated with the use of the maximum concentration in the risk assessment.

Arsenic, the principal risk driver for the industrial scenario, was identified as a COPC in surface soil only. As discussed in Section 6.2 of this attachment, metal soil concentrations were statistically compared with background concentrations to identify site-related COPCs. The statistical approach was based on a comparison of maximum detected on-site concentrations to the 95th percentile of the background data and use of the Wilcoxon Rank Sum test and the Quantile test to analyze the hypothesis that on-site concentrations are less than or equal to background concentrations. Thus, the metals selected were unique to each soil sample data set. Exposure to arsenic in the surface soil resulted in industrial risk estimates greater than residential risk estimates.

The qualifiers associated with reported concentrations of benzo(a)pyrene, dibenz(a,h)anthracene, and Aroclor 1260 indicate uncertainty in the reported values. The majority of detects for the organic analytes are qualified as "J" by the data validators. Concentrations indicated by the "J" qualifier are estimated quantities and below the detection limit. Therefore, the risk results presented for Site 15 should not be taken as a characterization of absolute risk. Conclusions by risk managers about the significance of the risk will need to integrate the uncertainties affecting the risk estimates.

As presented in the previous section, a background or reference level cancer and noncancer risk was also estimated for the metals and anthropogenic chemicals (i.e., PAHs and pesticides) identified as Site 15 COPCs. The comparison between the on-site and background levels provides additional information to be used by risk managers in reaching site-specific decisions. The more significant difference between on-site and background risk (i.e., reference level) estimates is generally associated with the organic COPCs. Comparable on-site and background risk estimates were quantified for the inorganic COPCs. Background and reference risk estimates suggest that arsenic, dibenz(a,h)anthracene, and benzo(a)pyrene (cancer risk drivers) and manganese (the noncancer risk driver) may not be a result of site-specific releases or contamination. The low levels of these PAHs are consistent with the historical use of Unit 2 (i.e., equipment maintenance and cleaning). There is no known historical site activity that would have used arsenic or manganese. It is possible that arsenic compounds may have been used by agricultural or pest-control practices prior to construction and expansion of MCAS El Toro. The earliest insecticides developed for use against chewing insects were arsenic-containing formulas, chiefly copper acetoarsenite (Paris green), lead arsenate, and calcium arsenate. Sodium arsenite has been used as a sterilant herbicide and a potato vine killer. Sodium arsenate was formerly the toxicant in many ant syrups for household use. These applications were superseded because of hazard to man and animals (Meister 1991).

Other arsenic-containing herbicides and pesticides that could have been used at the station include Arsenal, arsenic acid, arsenic trioxide, cacodylic acid, calcium acid methanearsonate, calcium arsenate, calcium arsenite, disodium methanearsonate, monoammonium methanearsonate, and monosodium methanearsonate. These herbicides and pesticides were used typically to control weeds in industrial areas such as utility plant sites and petroleum tank farms and in baits to control insects and animals (Meister 1991). It is possible that such chemicals were used for these purposes at MCAS El Toro. Figure 6-3 depicts the background/reference level and the on-site cancer risk for the COPCs identified as risk drivers.

In the analysis of the above risk results, the risks were estimated for a current industrial worker and a hypothetical resident. Draft reuse plans have been formulated and indicate that the station will remain an airport. To provide risk managers with a margin of safety, the assessment assumed other land uses besides industry. ~~Therefore, this characterization includes a bias in the association between risk and the likelihood of occurrence.~~ Understanding the impacts of this uncertainty will help risk managers make better informed and reasoned risk-based decisions.

6.5 UNCERTAINTY ANALYSES

The estimated cancer risks and noncancer HIs presented in this risk assessment are based on numerous assumptions, most of which are considered conservative. As a result of the cumulative effect of these conservative assumptions, the estimated risks are thought to substantially overestimate actual risks. The uncertainties associated with these assumptions are presented in Section 6 of the main report. This section discusses the specific uncertainties associated with the assessment of Site 15.

6.5.1 Data Evaluation

Sampling programs are necessarily limited in space and time. Selecting representative sampling locations and collecting a sufficient number of samples determine the success of characterizing risk at a contaminated site. Phase I and II RI data from soil samples collected within the site boundaries were used in the identification of the COPCs and risk evaluation for Site 15. Phase II RI soil sampling at Site 15 was designed specifically so that when the Phase I and II RI data were combined the nature and extent of COPCs and human-health risk assessment could be assessed at each unit. The basis and methodology for the number of Phase II soil-boring locations and associated samples collected at these locations are outlined in the Work Plan (BNI 1995a). The Phase II RI soil-sampling design utilized at Site 15 was stratified random sampling. This type of sampling design uses random positioning to produce an unbiased configuration of sampling locations. The number of samples collected using this sampling design was statistically calculated on the basis of the preliminary risk value developed for the site units following the Phase I RI, the decision error limits set for the Phase II RI, and the area of the site unit. This sampling methodology provided a high level of confidence (95 percent) that the appropriate number of samples was collected to determine the nature and extent of contamination and conduct a human-health risk assessment (BNI 1995a).

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6.5.2 Exposure Assessment

The principal uncertainties associated with the exposure assessment are categorized by scenario assumptions and quantification of exposure-point concentrations. Section 6 of the main report discusses the uncertainties relative to the exposure scenarios. Specific sources of uncertainty associated with quantification of exposure-point concentrations corresponding to Site 15 are discussed below.

For several soil COPCs, a low frequency of detection or a small sample population rendered the use of the statistically derived 95 percent UCL inapplicable, and rendered the maximum reported chemical value the appropriate estimator for the exposure-point concentration. The assumption of long-term contact with the maximum concentration is conservative, and the use of maximum concentrations in the risk assessment results in overestimates of exposures and risks. ~~However, there is some uncertainty whether risk assessments address the full magnitude of potential risks associated with those results from a small sample population.~~

~~Furthermore, in evaluating data, several assumptions were made that result in uncertainty in the risk estimate.~~ For estimating means and 95 percent UCLs on the mean, one-half the detection limit was used for results reported as undetected. Hence, the exposure-point concentrations for analytes characterized by a large number of nondetects are largely based on estimates rather than actual concentrations. "J"-qualified data were used quantitatively in the baseline human-health risk assessment and "lose" the meaning of their qualifier (i.e., the value is estimated [U.S. EPA 1989]). Some of the detects for the inorganic COPCs. Background and reference risk estimates suggest that arsenic, dibenz(a,h)anthracene, and benzo(a)pyrene (cancer risk drivers) and manganese (the noncancer risk driver) may not be a result of site-specific releases or contamination. The low levels of these PAHs are consistent with the historical use of Unit 2 (i.e., equipment maintenance and cleaning). There is no known historical site activity that would have used arsenic or manganese. It is possible that arsenic compounds may have been used by agricultural or pest-control practices prior to construction and expansion of MCAS El Toro. The earliest insecticides developed for use against chewing insects were arsenic-containing formulas, chiefly copper acetoarsenite (Paris green), lead arsenate, and calcium arsenate. Sodium arsenite has been used as a sterilant herbicide and a potato vine killer. Sodium arsenate was formerly the toxicant in many ant syrups for household use. These applications were superseded because of hazard to man and animals (Meister 1991).

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6.5.3 Toxicity Assessment

Toxicity values (slope factors and RfDs) were not available for all of the chemical COPCs. Some chemicals lacking toxicity criteria were assessed quantitatively with surrogate criteria (i.e., DDD, endosulfan I) Uncertainty related to lack of an RfD might result in an underestimation or overestimation of risk.

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Section 7
CONCLUSIONS AND RECOMMENDATIONS

This section presents the conclusions and recommendations of the RI conducted for Site 15. Included in this section are brief summaries of the physical characteristics, nature and extent of contamination, fate and transport of contaminants, and results of the human-health risk assessment. These results furnish responses to DQO decisions that provided the framework for the RI at Site 15. Recommendations are presented for future actions.

7.1 SUMMARY

The purpose of the Phase II RI was to characterize contamination at Unit 2 in support of risk assessment and HI determinations for Site 15. There were two primary conditions that necessitated sampling under the second phase of the program.

- The nature of the historical activities at Site 15 suggested that shallow soil at Site 15, Unit 2, may be contaminated with TPH, PAHs, pesticides, and PCBs, and, possibly, metals.
- Phase II sampling was intended to address the area behind Building 31(Unit 2), which includes the concrete pad and drainage path. This unit was not sampled during the Phase I investigation. The Phase II data set will be used to calculate the excess lifetime cancer risk and perform the HI assessment for Site 15, Unit 2.

The following discussion summarizes the key information provided by the Phase II sampling that addresses these data needs. This discussion specifically focuses on the fulfillment of the DQOs that were defined in the Work Plan to address these conditions (Table 7-1).

7.1.1 Physical Characteristics

Site 15 is located in the northwest~~east~~ quadrant of MCAS El Toro. The site is north and west of West Marine Way, behind Building 31. The site consists of one unit (Unit 2). The terrain in the immediate area is relatively flat. Surface grades are approximately 0 to 3 percent. The site surface is generally covered with dirt and gravel, except for a concrete pad and metal matting area abutting Building 31. A drainage ditch runs off the southwest corner of the concrete pad. Surface drainage from the site appears to flow from northeast to southwest along the drainage ditch. Water often ponds at the southwest end of the ditch near the site perimeter fence.

7.1.2 Nature and Extent of Contamination

Defining the nature and extent of contamination at Site 15 is an important aspect of addressing the Site 15 DQOs. Petroleum hydrocarbons, PAHs, pesticides, PCBs, and TAL metals at concentrations above background levels are present in shallow soil throughout Site 15. PAHs and TAL metals are the primary contaminants identified at Site 15, and they are also the most widely distributed classes of chemicals present in shallow soil at the site. The distribution of the risk drivers identified in the Site 15 risk assessment is illustrated in Figure 7-1.

Table 7-1
OU[a]-3A Phase II RI[b] Site 15 Results

DQO[c] Decisions (Section 1)	Physical Characteristics (Section 3)	Nature and Extent (Section 4)	Fate and Transport (Section 5)	Risk Assessment (Section 6)[d]	Recommendation
1. Assess whether COPCs[e] in shallow soil exceed screening levels (background and PRGs[f]) and/or present unacceptable risk.	Site is level with surface soil that is hard-packed and partially vegetated. There is a drainage ditch~~area~~ at the site which collects surface runoff and carries it to the southwest end of the site where it ponds~~discharges to an area off-site~~.	PAHs[g] and TAL[h] metals are present in various areas in shallow soil throughout the site.	Two potential migration pathways are air and surface water. PAHs and TAL metals are stable in the environment.	Risk to a resident is 4.2E-6/5.1E-6 and the risk to an industrial worker is 1.1E-5/1.2E-5 for cancer.	No remedial action necessary
2. Determine the extent of contamination in shallow soil (< 10 feet bgs[i]).	NA[j]	PAHs and TAL metals are present in various areas in shallow soil throughout the site. BCT[k] agrees extent of contamination in shallow soil is defined sufficiently to reach a decision for future actions.	NA	NA	No further action necessary
3. Determine if extent of contamination extends into deeper subsurface soil (> 10 feet bgs).	NA	Data from shallow soil investigation indicates site-specific contaminants do not extend into deeper subsurface soil. BCT agrees that sampling below a depth of 10 feet bgs was not necessary to define the extent of contamination at the site.	NA	NA	No further action necessary

(table continues)

Table 7-1 (continued)

DQO[c] Decisions (Section 1)	Physical Characteristics (Section 3)	Nature and Extent (Section 4)	Fate and Transport (Section 5)	Risk Assessment (Section 6)[d]	Recommendation
4. Determine if site qualifies for Early Action.	NA	PAHs and TAL metals are present in various areas in shallow soil throughout the site.	The analysis indicates that the two potential migration pathways are air and surface water, and suggested that contaminants in soil are not readily mobilized and transported off-site. Further due to the low net infiltration rates, transport of chemicals downward in the soil profile appears to be negligible.	Site does not appear to be an imminent threat to human health or the environment.	No early action necessary

Notes:
- [a] OU – operable unit
- [b] RI – Remedial Investigation
- [c] DQO – Data Quality Objective
- [d] United States Environmental Protection Agency (U.S. EPA)/California Environmental Protection Agency
- [e] COPC – chemical of potential concern
- [f] PRG – (U.S. EPA) preliminary remediation goal
- [g] PAH – polynuclear aromatic hydrocarbon
- [h] TAL – target analyte list
- [i] bgs – below ground surface
- [j] NA – not applicable
- [k] BCT – Base Realignment and Closure (BRAC) Cleanup Team

7.1.3 Fate and Transport

The fate-and-transport analysis evaluated release mechanisms and transport pathways for Site 15. The analysis indicates that the two potential migration pathways at Site 15 are air and surface water and suggested that contaminants in soil at Site 15 are not readily mobilized and transported off-site. Furthermore, due to the low net infiltration rates and the persistence of the PAHs, PCBs, and metals in soil, transport of chemicals downward in the soil profile appears to be negligible.

7.1.4 Human-Health Risk Assessment

The risk assessment was performed to determine whether contaminants at Site 15 present a carcinogenic or noncarcinogenic risk to human health. The significance of cancer and noncancer risk values is discussed in Section 6.6 of the main report. The results of the human-health risk assessment are summarized as follows.

The following receptors were analyzed for human-health risk:

- on-site resident, and
- on-site industrial worker.

The risk associated with Site 15 is as follows:

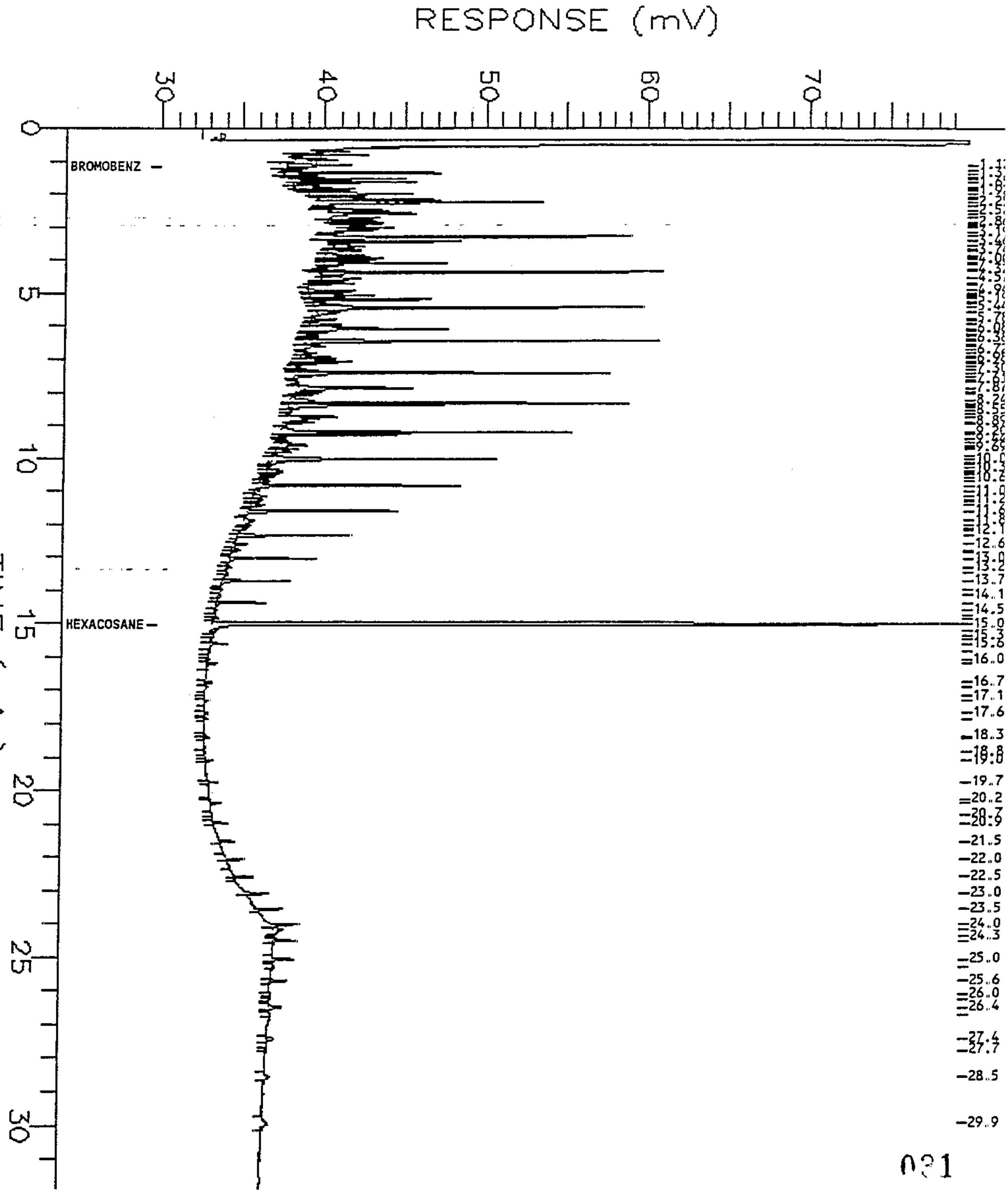
- the cancer risk for an on-site resident is 4.2×10^{-6} using U.S. EPA toxicity criteria and 5.1×10^{-6} using Cal-EPA toxicity criteria;
- the cancer risk for an on-site industrial worker is 1.1×10^{-5} using U.S. EPA toxicity criteria and 1.2×10^{-5} using Cal-EPA toxicity criteria;
- the HI for an on-site resident is 1.1 using U.S. EPA toxicity criteria; and
- the HI for an on-site industrial worker is 0.12 using U.S. EPA toxicity criteria.

The cancer risks estimated future residents and industrial workers at ~~for~~ Unit 2 are within the acceptable risk range of 10^{-4} to 10^{-6} as stated in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) ~~(10^{-6} to 10^{-4})~~. In Unit 2, arsenic is responsible for 70 percent of carcinogenic risk in the industrial scenario. The cancer risk due to arsenic at Unit 2 is approximately four times higher than background in the industrial scenario.

These arsenic concentrations are not attributable to known historical sites activities. Possible explanations for the high arsenic concentrations at the Site 15 could be:

- the concentrations of arsenic in soil in the immediate vicinity of Site 15 may have a higher background concentration than the statistically calculated background concentrations of arsenic for MCAS El Toro; and
- as discussed in Section 6.4.3 of this attachment, arsenic was widely used in various herbicides and pesticides in the past. The area of MCAS El Toro was primarily agricultural prior to construction and expansion of the Station. Levels of arsenic at the site may be attributable to past agricultural or pest-control practices.

Sample Name : DIESEL 500MG/L | Sample #: 95WS1672 | Page 1 of 1
FileName : g:\gc13\chb\036B002.raw | Date : 2/5/96 09:24 AM
Method : TEH.ins | Time of Injection: 2/5/96 08:50 AM
Start Time : 0.00 min | End Time : 31.92 min | Low Point : 29.87 mV | High Point : 79.87 mV
Scale Factor: -1 | Plot Offset: 30 mV | Plot Scale: 50 mV

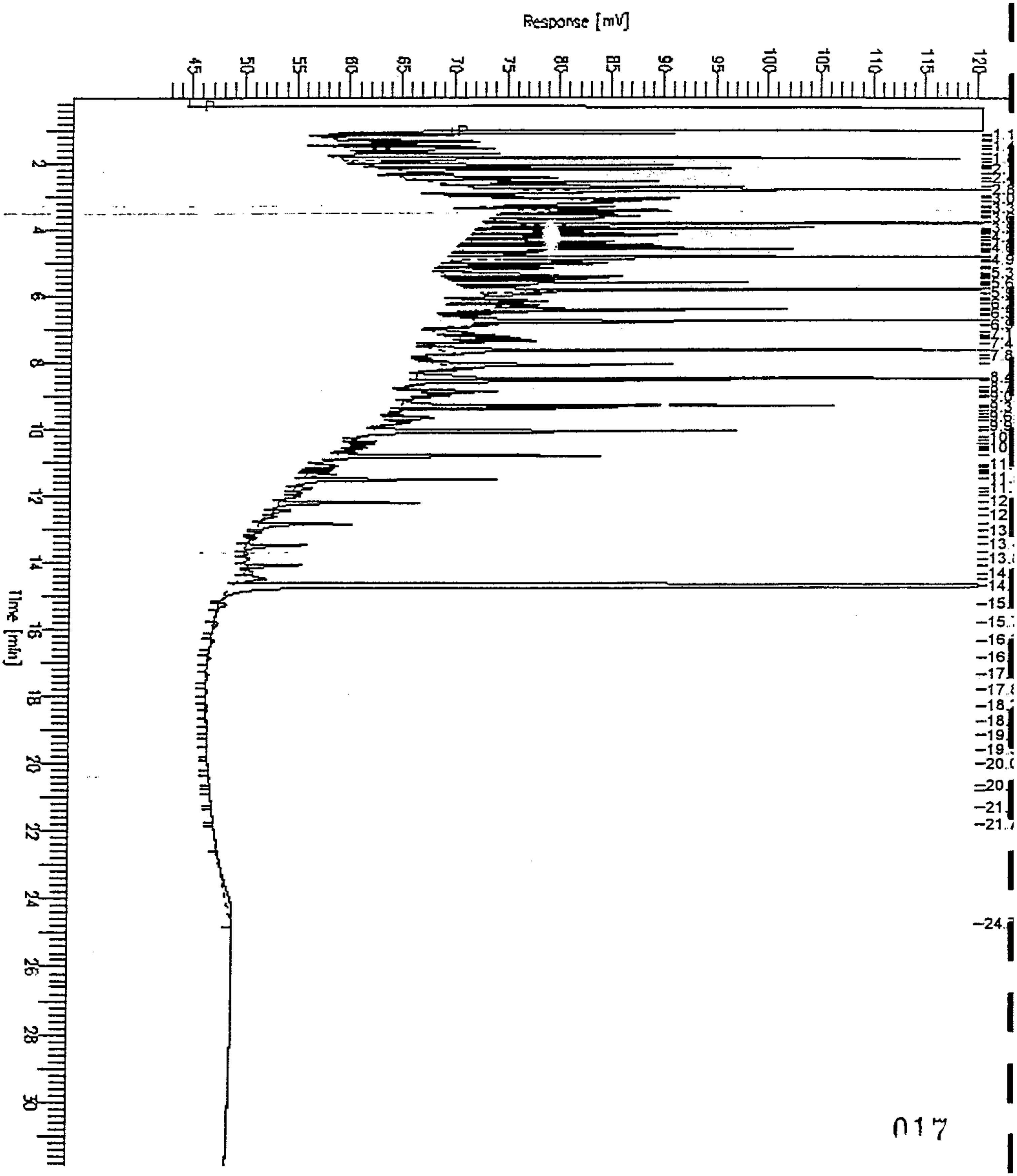


Diesel

GC15 Channel A TEH

Sample Name : CCV,96WS1948,DSL
FileName : C:\GC15\CHB\067B021.RAW
Method : BTEH.MTH
Start Time : 0.01 min   End Time : 31.91 min
Scale Factor: 0.0   Plot Offset: 42 mV

Sample #: DSL
Date : 3/8/96 01:45 PM
Time of Injection: 3/8/96 05:52 AM
Low Point : 42.49 mV   High Point : 120.49 mV
Plot Scale: 78.0 mV

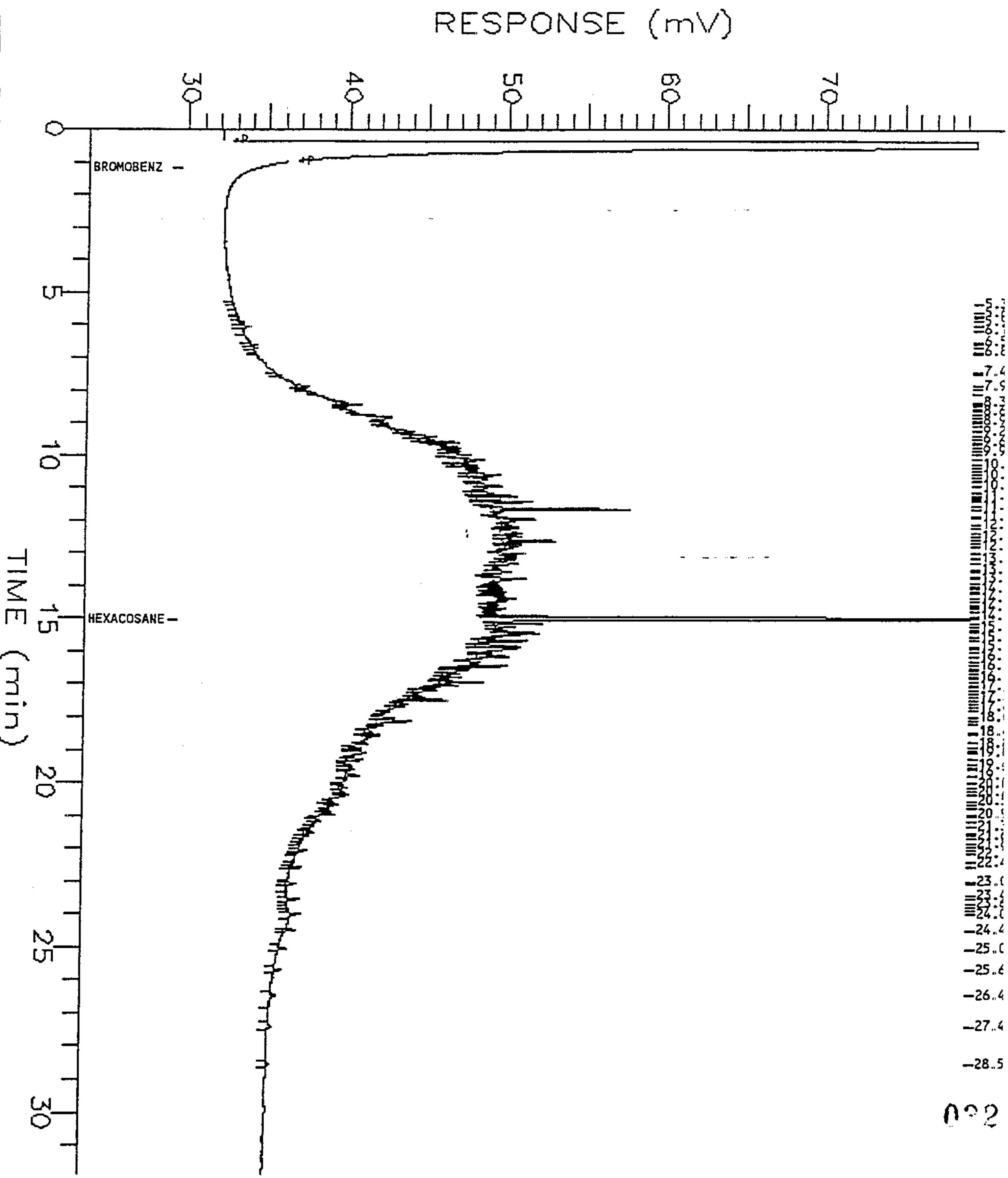


017

TEH Chromatogram-GC13 CH B

Sample Name : HYDRAULIC OIL 1000MG/L
FileName : g:\gc13\chb\036B004.raw
Method : TEH.ins
Start Time : 0.00 min
End Time : 31.92 min
Scale Factor: -1
Plot Offset: 30 mV

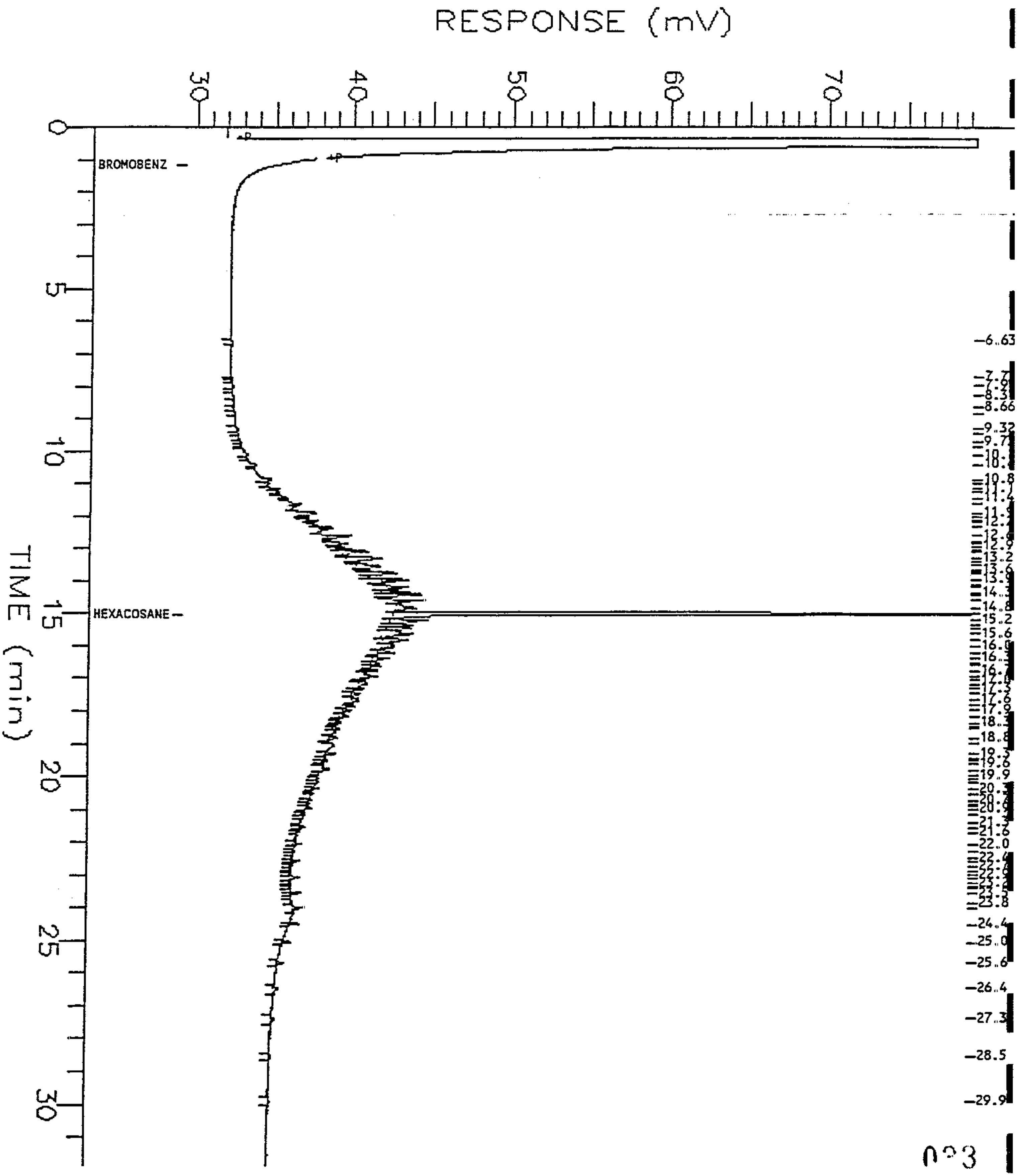
Sample #: 95WS1477
Date : 2/5/96 10:49 AM
Time of Injection: 2/5/96 10:15 AM
Low Point : 29.53 mV
High Point : 79.53 mV
Plot Scale: 50 mV



TEH Chromatogram-GC13 CH B

Sample Name : MOTOR OIL 500MG/L
FileName : g:\gc13\chb\036B005.raw
Method : TEH.ins
Start Time : 0.00 min End Time : 31.92 min
Scale Factor: -1 Plot Offset: 29 mV

Sample #: 95WS1596 Page 1 of 1
Date : 2/5/96 11:31 AM
Time of Injection: 2/5/96 10:58 AM
Low Point : 29.31 mV High Point : 79.31 mV
Plot Scale: 50 mV



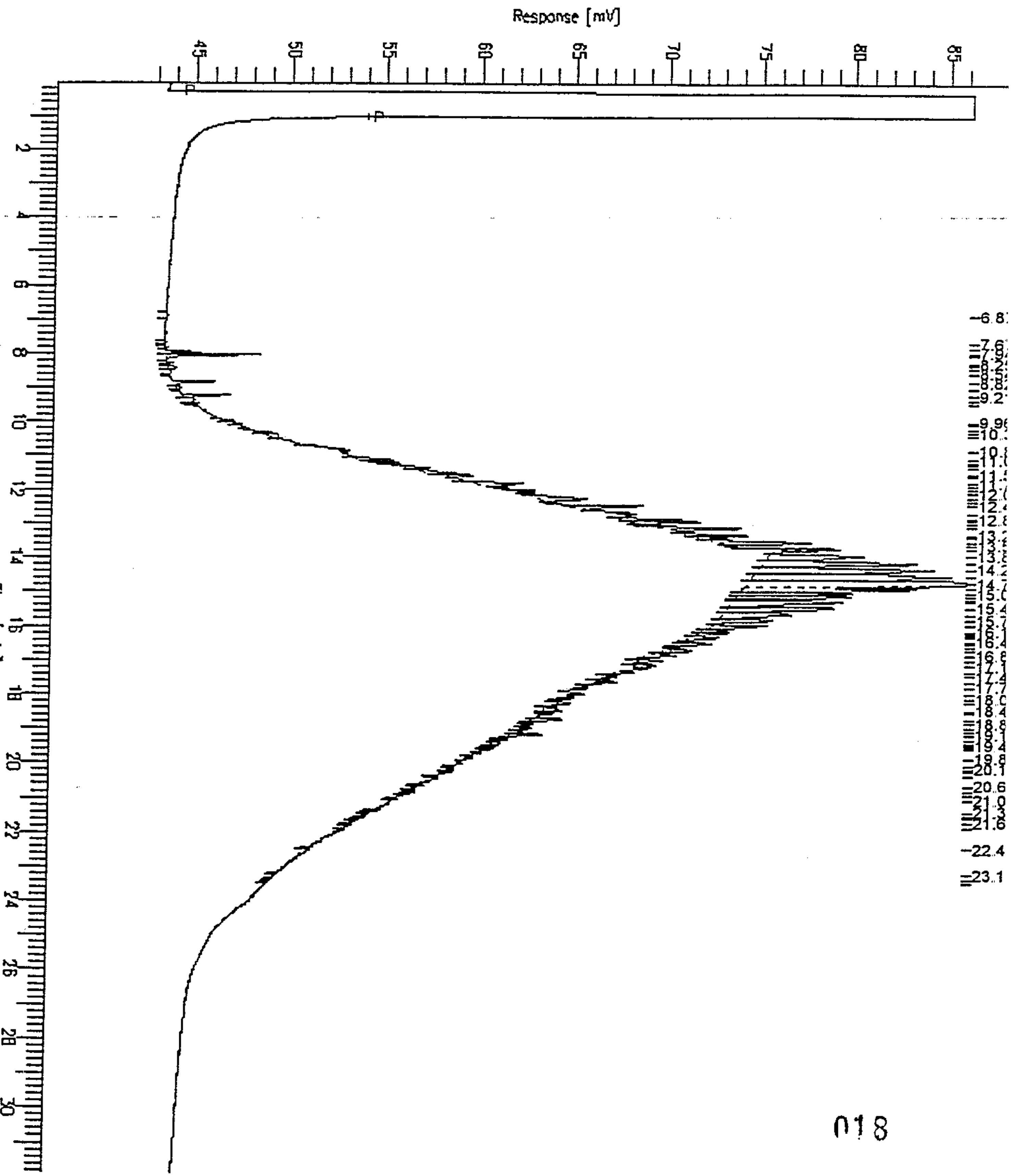
Sample Name : MOTOR OIL
FileName : C:\GC15\CHB\067B008.RAW
Method : BTEH.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: 42 mV

Sample #:
Date : 3/8/96 02:01 PM
Time of Injection: 3/7/96 08:23 PM
Low Point : 42.50 mV
Plot Scale: 43.7 mV

Page 1 of 1

High Point : 86.16 mV



018

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Lab #: 124235

BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

METHOD BLANK

Matrix: Soil
Batch#: 25700
Units: mg/Kg
Diln Fac: 1

Prep Date: 02/01/96
Analysis Date: 02/02/96

MB Lab ID: QC14211

Analyte	Result	
Diesel Range	<10	
Hydraulic Fluid	<250	
JP5 (C10-C16)	<10	
Motor Oil C22-C50	<250	
Surrogate	**%Rec**	**Recovery Limits**
Hexacosane	94	60-140

Curtis & Tompkins, Ltd

TEH-Tot Ext Hydrocarbons	
Client: OHM Remediation Services	Analysis Method: CA LUFT (EPA 8015M)
Project#: 17486	Prep Method: EPA 3520
Location: Former UST Sites DO 0024	

METHOD BLANK	
Matrix: Water	Prep Date: 02/01/96
Batch#: 25709	Analysis Date: 02/05/96
Units: ug/L	
Diln Fac: 1	

MB Lab ID: QC14256

Analyte	Result	
Diesel Range	<50	
Hydraulic Fluid	<1300	
JP5 (C10-C16)	<50	
Motor Oil C22-C50	<1300	
Surrogate	**%Rec**	**Recovery Limits**
Hexacosane	100	60-140

NM: Not meaningful
LR: Over linear range

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TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services	Analysis Method: CA LUFT (EPA 8015M)
Project#: 17486	Prep Method: LUFT
Location: El Toro MCAS,Former UST	

METHOD BLANK

Matrix: Soil	Prep Date: 03/01/96
Batch#: 26220	Analysis Date: 03/07/96
Units: mg/Kg	
Diln Fac: 1	

MB Lab ID: QC16344

Analyte	Result	
JP5 (C10-C16)	<10	
Diesel Range	<10	
Motor Oil Range	<50	
Surrogate	**%Rec**	**Recovery Limits**
Hexacosane	89	60-140

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Lab #: 124235 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 25700
Units: mg/Kg
Diln Fac: 1

Prep Date: 02/01/96
Analysis Date: 02/02/96

LCS Lab ID: QC14212

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	381.6	495	77	60-140

Surrogate	%Rec	Limits
Hexacosane	93	60-140

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

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TEH-Tot Ext Hydrocarbons

Client:	OHM Remediation Services	Analysis Method:	CA LUFT (EPA 8015M)
Project#:	17486	Prep Method:	LUFT
Location:	El Toro MCAS,Former UST		

LABORATORY CONTROL SAMPLE

Matrix:	Soil	Prep Date:	03/01/96
Batch#:	26220	Analysis Date:	03/04/96
Units:	mg/Kg		
Diln Fac:	1		

LCS Lab ID: QC16345

Analyte	Result	Spike Added	%Rec #	Limits
Diesel Range	409	495	83	60-140

Surrogate	%Rec	Limits
Hexacosane	107	60-140

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

Lab #: 124235 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services	Analysis Method: CA LUFT (EPA 8015M)
Project#: 17486	Prep Method: EPA 3520
Location: Former UST Sites DO 0024	

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water	Prep Date: 02/01/96
Batch#: 25709	Analysis Date: 02/05/96
Units: ug/L	
Diln Fac: 1	

BS Lab ID: QC14257

Analyte	Spike Added	BS	%Rec #	Limits
Diesel Range	2475	2495	101	60-140

Surrogate	%Rec	Limits
Hexacosane	103	60-140

BSD Lab ID: QC14258

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel Range	2475	2337	94	60-140	7	<35

Surrogate	%Rec	Limits
Hexacosane	103	60-140

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

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Lab #: 124626 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS,Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: LUFT

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 124612-044
Matrix: Soil
Batch#: 26220
Units: mg/Kg dry weight
Diln Fac: 1

Sample Date: 02/27/96
Received Date: 02/29/96
Prep Date: 03/01/96
Analysis Date: 03/05/96
Moisture: 11%

MS Lab ID: QC16346

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Diesel Range	556.2	<112.4	577.5	104	60-140

Surrogate	%Rec	Limits
Hexacosane	121	60-140

MSD Lab ID: QC16347

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Diesel Range	556.2	450.6	81	60-140	25	<30

Surrogate	%Rec	Limits
Hexacosane	114	60-140

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-001	96-IRP15-SB01-S-248	25713	01/29/96	02/02/96	02/02/96	12%
124235-002	96-IRP15-SB02-S-249	25713	01/29/96	02/02/96	02/02/96	8%
124235-003	96-IRP15-SB03-S-250	25713	01/29/96	02/02/96	02/02/96	6%
124235-004	96-IRP15-SB04-S-251	25713	01/29/96	02/02/96	02/02/96	8%

Analyte Diln Fac:	Units	124235-001 1	124235-002 1	124235-003 1	124235-004 1
Gasoline	mg/Kg	<1.1	<1.1	<1.1	<1.1
Jet Fuel #4 (JP4)	mg/Kg	<1.1	<1.1	<1.1	<1.1
Surrogate					
Trifluorotoluene	%REC	97	95	94	94
Bromobenzene	%REC	103	101	100	98

TVH-Total Volatile Hydrocarbons

Client:	OHM Remediation Services	Analysis Method:	CA LUFT (EPA 8015M)
Project#:	17486	Prep Method:	EPA 5030
Location:	Former UST Sites DO 0024		

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-005	96-IRP15-SB05-S-252	25713	01/29/96	02/02/96	02/02/96	1%
124235-006	96-IRP15-SB06-S-253	25713	01/29/96	02/02/96	02/02/96	14%
124235-007	96-IRP15-SB07-S-254	25713	01/29/96	02/02/96	02/02/96	9%
124235-008	96-IRP15-SB08-S-255	25713	01/29/96	02/02/96	02/02/96	11%

Analyte Diln Fac:	Units	124235-005 1	124235-006 1	124235-007 1	124235-008 1
Gasoline	mg/Kg	<1	<1.2	<1.1	<1.1
Jet Fuel #4 (JP4)	mg/Kg	<1	<1.2	<1.1	<1.1
Surrogate					
Trifluorotoluene	%REC	95	95	91	94
Bromobenzene	%REC	99	100	100	101

TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-009	96-IRP15-SB05-S-256	25713	01/29/96	02/02/96	02/02/96	6%
124235-012	96-IRP-19-SB01-S-259	25713	01/29/96	02/02/96	02/02/96	6%
124235-013	96-IRP-19-SB02-S-260	25713	01/29/96	02/02/96	02/02/96	7%
124235-014	96-IRP-19-SB03-S-261	25713	01/29/96	02/02/96	02/02/96	6%

Analyte Diln Fac:	Units	124235-009 1	124235-012 1	124235-013 1	124235-014 1
Gasoline	mg/Kg	<1.1	<1.1	<1.1	<1.1
Jet Fuel #4 (JP4)	mg/Kg	<1.1	<1.1	<1.1	<1.1
Surrogate					
Trifluorotoluene	%REC	71	97	98	99
Bromobenzene	%REC	73	103	107	106

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TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services	Analysis Method: CA LUFT (EPA 8015M)
Project#: 17486	Prep Method: EPA 5030
Location: Former UST Sites DO 0024	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-010	96-IRP15-ER-257	25694	01/29/96	02/01/96	02/01/96	
124235-011	96-TB-W-258	25694	01/29/96	02/01/96	02/01/96	
124235-018	96-IRP19-ER-265	25694	01/29/96	02/01/96	02/01/96	

Analyte	Units	124235-010	124235-011	124235-018
Diln Fac:		1	1	1
Gasoline	ug/L	<50	<50	<50
Jet Fuel #4 (JP4)	ug/L	<50	<50	<50
Surrogate				
Trifluorotoluene	%REC	88	89	87
Bromobenzene	%REC	84	84	83

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TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS,Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124626-002	96-IRP15-S-269	26204	02/29/96	03/02/96	03/02/96	10%
124626-003	96-IRP15-S-270	26204	02/29/96	03/02/96	03/02/96	11%
124626-004	96-IRP15-S-271	26204	02/29/96	03/02/96	03/02/96	9%
124626-005	96-IRP15-S-272	26204	02/29/96	03/02/96	03/02/96	6%

Analyte Diln Fac:	Units	124626-002 1	124626-003 1	124626-004 1	124626-005 1
Gasoline	mg/Kg	<1.1	<1.1	<1.1	<1.1
Jet Fuel #4 (JP4)	mg/Kg	<1.1	<1.1	<1.1	<1.1
Surrogate					
Trifluorotoluene	%REC	91	96	94	94
Bromobenzene	%REC	83	87	87	84

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TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS,Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124626-006	96-IRP15-S-273	26204	02/29/96	03/02/96	03/02/96	10%

Analyte	Units	124626-006
Diln Fac:		1
Gasoline	mg/Kg	<1.1
Jet Fuel #4 (JP4)	mg/Kg	<1.1
Surrogate		
Trifluorotoluene	%REC	93
Bromobenzene	%REC	82

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Lab #: 124235

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services	Analysis Method: CA LUFT (EPA 8015M)
Project#: 17486	Prep Method: EPA 5030
Location: Former UST Sites DO 0024	

METHOD BLANK

Matrix: Soil	Prep Date: 02/02/96
Batch#: 25713	Analysis Date: 02/02/96
Units: mg/Kg	
Diln Fac: 1	

MB Lab ID: QC14288

Analyte	Result	
Gasoline	<1.0	
Jet Fuel #4 (JP4)	<1.0	
Surrogate	**%Rec**	**Recovery Limits**
Trifluorotoluene	95	52-127
Bromobenzene	91	45-140

Curtis & Tompkins, Ltd

Lab #: 124235 BATCH QC REPORT

TVH-Total Volatile Hydrocarbons

Client:	OHM Remediation Services	Analysis Method:	CA LUFT (EPA 8015M)
Project#:	17486	Prep Method:	EPA 5030
Location:	Former UST Sites DO 0024		

METHOD BLANK

Matrix:	Water	Prep Date:	02/01/96
Batch#:	25694	Analysis Date:	02/01/96
Units:	ug/L		
Diln Fac:	1		

MB Lab ID: QC14190

Analyte	Result
Gasoline	<50
Jet Fuel #4 (JP4)	<50

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	88	69-120
Bromobenzene	83	70-122

Lab #: 124235

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons

Client:	OHM Remediation Services	Analysis Method:	CA LUFT (EPA 8015M)
Project#:	17486	Prep Method:	EPA 5030
Location:	Former UST Sites DO 0024		

METHOD BLANK

Matrix:	Soil	Prep Date:	02/02/96
Batch#:	25713	Analysis Date:	02/02/96
Units:	mg/Kg		
Diln Fac:	1		

MB Lab ID: QC14288

Analyte	Result	
Gasoline	<1.0	
Jet Fuel #4 (JP4)	<1.0	
Surrogate	**%Rec**	**Recovery Limits**
Trifluorotoluene	95	52-127
Bromobenzene	91	45-140

Curtis & Tompkins, Ltd

Lab #: 124235 BATCH QC REPORT

TVH-Total Volatile Hydrocarbons

Client:	OHM Remediation Services	Analysis Method:	CA LUFT (EPA 8015M)
Project#:	17486	Prep Method:	EPA 5030
Location:	Former UST Sites DO 0024		

METHOD BLANK

Matrix:	Water	Prep Date:	02/01/96
Batch#:	25694	Analysis Date:	02/01/96
Units:	ug/L		
Diln Fac:	1		

MB Lab ID: QC14190

Analyte	Result	
Gasoline	<50	
Jet Fuel #4 (JP4)	<50	
Surrogate	**%Rec**	**Recovery Limits**
Trifluorotoluene	88	69-120
Bromobenzene	83	70-122

Curtis & Tompkins Ltd

TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: El Toro MCAS,Former UST

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

METHOD BLANK

Matrix: Soil
Batch#: 26204
Units: mg/Kg
Diln Fac: 1

Prep Date: 03/01/96
Analysis Date: 03/01/96

MB Lab ID: QC16275

Analyte	Result	
Gasoline	<1.0	
Jet Fuel #4 (JP4)	<1.0	
Surrogate	**%Rec**	**Recovery Limits**
Trifluorotoluene	106	52-127
Bromobenzene	98	45-140

Lab #: 124235

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 25713
Units: mg/Kg
Diln Fac: 1

Prep Date: 02/02/96
Analysis Date: 02/02/96

LCS Lab ID: QC14286

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline	10.3	10	103	80-120
Surrogate	**%Rec**	**Limits**		
Trifluorotoluene	118	52-127		
Bromobenzene	117	45-140		

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

Lab #: 124235

BATCH QC REPORT

TVH-Total Volatile Hydrocarbons

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 25694
Units: ug/L
Diln Fac: 1

Prep Date: 02/01/96
Analysis Date: 02/01/96

LCS Lab ID: QC14193

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline	2159	2000	108	80-120

Surrogate	%Rec	Limits
Trifluorotoluene	79	69-120
Bromobenzene	91	70-122

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

Curtis & Tompkins, Ltd

TVH-Total Volatile Hydrocarbons

Client:	OHM Remediation Services	Analysis Method:	CA LUFT (EPA 8015M)
Project#:	17486	Prep Method:	EPA 5030
Location:	El Toro MCAS,Former UST		

LABORATORY CONTROL SAMPLE

Matrix:	Soil	Prep Date:	03/01/96
Batch#:	26204	Analysis Date:	03/01/96
Units:	mg/Kg		
Diln Fac:	1		

LCS Lab ID: QC16413

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline	9.4	10	94	80-120

Surrogate	%Rec	Limits
Trifluorotoluene	98	52-127
Bromobenzene	78	45-140

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits
NM: Not meaningful

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-001	96-IRP15-SB01-S-248	25713	01/29/96	02/02/96	02/02/96	12%
124235-002	96-IRP15-SB02-S-249	25713	01/29/96	02/02/96	02/02/96	8%
124235-003	96-IRP15-SB03-S-250	25713	01/29/96	02/02/96	02/02/96	6%
124235-004	96-IRP15-SB04-S-251	25713	01/29/96	02/02/96	02/02/96	8%

Analyte Diln Fac:	Units	124235-001 1	124235-002 1	124235-003 1	124235-004 1
Benzene	ug/Kg	<5.7	<5.4	<5.3	<5.4
Toluene	ug/Kg	<5.7	<5.4	<5.3	<5.4
Ethylbenzene	ug/Kg	<5.7	<5.4	<5.3	<5.4
m,p-Xylenes	ug/Kg	<5.7	<5.4	<5.3	<5.4
o-Xylene	ug/Kg	<5.7	<5.4	<5.3	<5.4
Surrogate					
Trifluorotoluene	%REC	100	99	98	97
Bromobenzene	%REC	107	105	104	101

Curtis & Tompkins, Ltd

BTXE

Client:	OHM Remediation Services	Analysis Method:	EPA 8020
Project#:	17486	Prep Method:	EPA 5030
Location:	Former UST Sites DO 0024		

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-005	96-IRP15-SB05-S-252	25713	01/29/96	02/02/96	02/02/96	1%
124235-006	96-IRP15-SB06-S-253	25713	01/29/96	02/02/96	02/02/96	14%
124235-007	96-IRP15-SB07-S-254	25713	01/29/96	02/02/96	02/02/96	9%
124235-008	96-IRP15-SB08-S-255	25713	01/29/96	02/02/96	02/02/96	11%

Analyte Diln Fac:	Units	124235-005 1	124235-006 1	124235-007 1	124235-008 1
Benzene	ug/Kg	<5.1	<5.8	<5.5	<5.6
Toluene	ug/Kg	<5.1	<5.8	<5.5	<5.6
Ethylbenzene	ug/Kg	<5.1	<5.8	<5.5	<5.6
m,p-Xylenes	ug/Kg	<5.1	<5.8	<5.5	<5.6
o-Xylene	ug/Kg	<5.1	<5.8	<5.5	<5.6
Surrogate					
Trifluorotoluene	%REC	99	99	96	95
Bromobenzene	%REC	103	104	105	101

BTXE

Client: OHM Remediation Services	Analysis Method: EPA 8020
Project#: 17486	Prep Method: EPA 5030
Location: Former UST Sites DO 0024	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-009	96-IRP15-SB05-S-256	25713	01/29/96	02/02/96	02/02/96	6%
124235-012	96-IRP-19-SB01-S-259	25713	01/29/96	02/02/96	02/02/96	6%
124235-013	96-IRP-19-SB02-S-260	25713	01/29/96	02/02/96	02/02/96	7%
124235-014	96-IRP-19-SB03-S-261	25713	01/29/96	02/02/96	02/02/96	6%

Analyte	Units	124235-009	124235-012	124235-013	124235-014
Diln Fac:		1	1	1	1
Benzene	ug/Kg	<5.3	<5.3	<5.4	<5.3
Toluene	ug/Kg	41	6.2	13	40
Ethylbenzene	ug/Kg	<5.3	<5.3	<5.4	<5.3
m,p-Xylenes	ug/Kg	<5.3	<5.3	<5.4	<5.3
o-Xylene	ug/Kg	<5.3	<5.3	<5.4	<5.3
Surrogate					
Trifluorotoluene	%REC	72	97	98	98
Bromobenzene	%REC	75	104	106	106

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124235-010	96-IRP15-ER-257	25694	01/29/96	02/01/96	02/01/96	
124235-011	96-TB-W-258	25694	01/29/96	02/01/96	02/01/96	
124235-018	96-IRP19-ER-265	25694	01/29/96	02/01/96	02/01/96	

Analyte	Units	124235-010	124235-011	124235-018
Diln Fac:		1	1	1
Benzene	ug/L	<0.5	<0.5	<0.5
Toluene	ug/L	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	<0.5	<0.5	<0.5
m,p-Xylenes	ug/L	<0.5	<0.5	<0.5
o-Xylene	ug/L	<0.5	<0.5	<0.5
Surrogate				
Trifluorotoluene	%REC	98	97	97
Bromobenzene	%REC	95	96	94

BTXE

Client: OHM Remediation Services	Analysis Method: EPA 8020
Project#: 17486	Prep Method: EPA 5030
Location: El Toro MCAS,Former UST	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124626-002	96-IRP15-S-269	26204	02/29/96	03/02/96	03/02/96	10%
124626-003	96-IRP15-S-270	26204	02/29/96	03/02/96	03/02/96	11%
124626-004	96-IRP15-S-271	26204	02/29/96	03/02/96	03/02/96	9%
124626-005	96-IRP15-S-272	26204	02/29/96	03/02/96	03/02/96	6%

Analyte	Units	124626-002	124626-003	124626-004	124626-005
Diln Fac:		1	1	1	1
Benzene	ug/Kg	<5.6	<5.6	<5.5	<5.3
Toluene	ug/Kg	<5.6	<5.6	<5.5	<5.3
Ethylbenzene	ug/Kg	<5.6	<5.6	<5.5	<5.3
m,p-Xylenes	ug/Kg	<5.6	<5.6	<5.5	<5.3
o-Xylene	ug/Kg	<5.6	<5.6	<5.5	<5.3
Surrogate					
Trifluorotoluene	%REC	86	89	88	89
Bromobenzene	%REC	75	78	79	78

Curtis & Tompkins Ltd

BTXE

Client: OHM Remediation Services	Analysis Method: EPA 8020
Project#: 17486	Prep Method: EPA 5030
Location: El Toro MCAS,Former UST	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
124626-006	96-IRP15-S-273	26204	02/29/96	03/02/96	03/02/96	10%

Analyte Diln Fac:	Units	124626-006 1
Benzene	ug/Kg	<5.6
Toluene	ug/Kg	<5.6
Ethylbenzene	ug/Kg	<5.6
m,p-Xylenes	ug/Kg	<5.6
o-Xylene	ug/Kg	<5.6
Surrogate		
Trifluorotoluene	%REC	88
Bromobenzene	%REC	74

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 124626-001
CLIENT: OHM REMEDIATION SERVICES
PROJECT ID: 17486
LOCATION: MCAS EL TORO
SAMPLE ID: 96-0229-W-TB

DATE SAMPLED: 02/29/96
DATE RECEIVED: 03/01/96
DATE ANALYZED: 03/05/96
BATCH NO: 26267

EPA 8020: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	REPORTING LIMIT ug/L
Benzene	ND	0.5
Toluene	ND	0.5
Ethyl Benzene	ND	0.5
m,p-Xylene	ND	0.5
o-Xylene	ND	0.5

ND = Not detected at or above reporting limit.

Surrogate Recovery	
Bromobenzene	101 % (Limits: 81-124)

Lab #: 124235

BATCH QC REPORT

BTXE	
Client: OHM Remediation Services	Analysis Method: EPA 8020
Project#: 17486	Prep Method: EPA 5030
Location: Former UST Sites DO 0024	

METHOD BLANK	
Matrix: Soil	Prep Date: 02/02/96
Batch#: 25713	Analysis Date: 02/02/96
Units: ug/Kg	
Diln Fac: 1	

MB Lab ID: QC14288

Analyte	Result	
Benzene	<5.0	
Toluene	<5.0	
Ethylbenzene	<5.0	
m,p-Xylenes	<5.0	
o-Xylene	<5.0	
Surrogate	**%Rec**	**Recovery Limits**
Trifluorotoluene	99	43-114
Bromobenzene	96	47-112

Lab #: 124235 BATCH QC REPORT

BTXE

Client: OHM Remediation Services	Analysis Method: EPA 8020
Project#: 17486	Prep Method: EPA 5030
Location: Former UST Sites DO 0024	

METHOD BLANK

Matrix: Water	Prep Date: 02/01/96
Batch#: 25694	Analysis Date: 02/01/96
Units: ug/L	
Diln Fac: 1	

MB Lab ID: QC14190

Analyte	Result	
Benzene	<0.5	
Toluene	<0.5	
Ethylbenzene	<0.5	
m,p-Xylenes	<0.5	
o-Xylene	<0.5	
Surrogate	**%Rec**	**Recovery Limits**
Trifluorotoluene	97	58-130
Bromobenzene	94	62-131

Curtis & Tompkins, Ltd

BATCH QC REPORT

BTXE

Client:	OHM Remediation Services	Analysis Method:	EPA 8020
Project#:	17486	Prep Method:	EPA 5030
Location:	El Toro MCAS,Former UST		

METHOD BLANK

Matrix:	Soil	Prep Date:	03/01/96
Batch#:	26204	Analysis Date:	03/01/96
Units:	ug/Kg		
Diln Fac:	1		

MB Lab ID: QC16275

Analyte	Result	
Benzene	<5.0	
Toluene	<5.0	
Ethylbenzene	<5.0	
m,p-Xylenes	<5.0	
o-Xylene	<5.0	
Surrogate	**%Rec**	**Recovery Limits**
Trifluorotoluene	104	43-114
Bromobenzene	95	47-112

Curtis & Tompkins Ltd

LABORATORY NUMBER: 124626-METHOD BLANK
CLIENT: OHM REMEDIATION SERVICES
PROJECT ID: 17486
LOCATION: MCAS EL TORO
SAMPLE ID: MB, QC16513

DATE ANALYZED: 03/05/96
BATCH NO: 26267

EPA 8020: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	REPORTING LIMIT ug/L
Benzene	ND	0.5
Toluene	ND	0.5
Ethyl Benzene	ND	0.5
m,p-Xylene	ND	0.5
o-Xylene	ND	0.5

ND = Not detected at or above reporting limit.

Surrogate Recovery

Bromobenzene	101 % (Limits: 81-124)

Curtis & Tompkins Ltd

Lab #: 124235

BATCH QC REPORT

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: EPA 8020
Prep Method: EPA 5030

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 25694
Units: ug/L
Diln Fac: 1

Prep Date: 02/01/96
Analysis Date: 02/01/96

BS Lab ID: QC14191

Analyte	Spike Added	BS	%Rec #	Limits
Benzene	20	20.2	101	80-120
Toluene	20	20.7	104	80-120
Ethylbenzene	20	20.5	103	80-120
m,p-Xylenes	40	41.3	103	80-120
o-Xylene	20	20.8	104	80-120

Surrogate	%Rec	Limits
Trifluorotoluene	97	58-130
Bromobenzene	96	62-131

BSD Lab ID: QC14192

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Benzene	20	20.3	102	80-120	1	<20
Toluene	20	20.8	104	80-120	1	<20
Ethylbenzene	20	20.6	103	80-120	1	<20
m,p-Xylenes	40	41.5	104	80-120	1	<20
o-Xylene	20	20.9	105	80-120	1	<20

Surrogate	%Rec	Limits
Trifluorotoluene	98	58-130
Bromobenzene	96	62-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

Curtis & Tompkins Ltd

LABORATORY NUMBER: 124626-METHOD BLANK
CLIENT: OHM REMEDIATION SERVICES
PROJECT ID: 17486
LOCATION: MCAS EL TORO
SAMPLE ID: MB, QC16513

DATE ANALYZED: 03/05/96
BATCH NO: 26267

EPA 8020: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	REPORTING LIMIT ug/L
Benzene	ND	0.5
Toluene	ND	0.5
Ethyl Benzene	ND	0.5
m,p-Xylene	ND	0.5
o-Xylene	ND	0.5

ND = Not detected at or above reporting limit.

Surrogate Recovery

Bromobenzene	101 % (Limits: 81-124)

Curtis & Tompkins, Ltd

Lab #: 124235

BATCH QC REPORT

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: EPA 8020
Prep Method: EPA 5030

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 25694
Units: ug/L
Diln Fac: 1

Prep Date: 02/01/96
Analysis Date: 02/01/96

BS Lab ID: QC14191

Analyte	Spike Added	BS	%Rec #	Limits
Benzene	20	20.2	101	80-120
Toluene	20	20.7	104	80-120
Ethylbenzene	20	20.5	103	80-120
m,p-Xylenes	40	41.3	103	80-120
o-Xylene	20	20.8	104	80-120

Surrogate	%Rec	Limits
Trifluorotoluene	97	58-130
Bromobenzene	96	62-131

BSD Lab ID: QC14192

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Benzene	20	20.3	102	80-120	1	<20
Toluene	20	20.8	104	80-120	1	<20
Ethylbenzene	20	20.6	103	80-120	1	<20
m,p-Xylenes	40	41.5	104	80-120	1	<20
o-Xylene	20	20.9	105	80-120	1	<20

Surrogate	%Rec	Limits
Trifluorotoluene	98	58-130
Bromobenzene	96	62-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

Curtis & Tompkins, Ltd

Curtis & Tompkins, Ltd

8010/8020 Laboratory Control Sample Report [Quant Column]

Date Analyzed: 05-MAR-96
Matrix: WATER
Batch No: 26267 326065168005

LCS Datafile: 065W005
Operator: AMP
GC ID: GC12

EPA METHOD 8010: HALOGENATED VOLATILE ORGANICS

	Instrdg	SpikeAmt	% Rec	Limits
1,1-Dichloroethene	17.7	20	89 %	68-134%
Trichloroethene	19.0	20	95 %	85-141%
Chlorobenzene	18.9	20	95 %	69-135%
Surrogate Recovery				
Bromobenzene	98.7	100	99 %	85-119%

EPA METHOD 8020: AROMATIC VOLATILE ORGANICS

Benzene	19.1	20	95 %	88-118%
Toluene	18.3	20	92 %	85-119%
Chlorobenzene	19.6	20	98 %	90-115%
Surrogate Recovery				
Bromobenzene	101.	100	101 %	81-124%

Column: Rtx 502.2
Water Limits based on LCS Data Generated 5/5/95
Soil Limits based on 3/90 SOW

Results within Specifications - PASS

Lab #: 124235

BATCH QC REPORT

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: EPA 8020
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: 96-IRP15-SB01-S-248
Lab ID: 124235-001
Matrix: Soil
Batch#: 25713
Units: ug/Kg dry weight
Diln Fac: 1

Sample Date: 01/29/96
Received Date: 01/30/96
Prep Date: 02/02/96
Analysis Date: 02/02/96
Moisture: 12%

MS Lab ID: QC14289

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	113.6	<5.682	114.1	100	75-125
Toluene	113.6	<5.682	120.5	106	75-125
Ethylbenzene	113.6	<5.682	113	99	75-125
m,p-Xylenes	227.3	<5.682	229.5	101	75-125
o-Xylene	113.6	<5.682	120.9	106	75-125

Surrogate	%Rec	Limits
Trifluorotoluene	98	43-114
Bromobenzene	104	47-112

MSD Lab ID: QC14290

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	113.6	107.6	95	75-125	6	<20
Toluene	113.6	112.2	99	75-125	7	<20
Ethylbenzene	113.6	104.7	92	75-125	8	<20
m,p-Xylenes	227.3	216.7	95	75-125	6	<20
o-Xylene	113.6	113.1	100	75-125	7	<20

Surrogate	%Rec	Limits
Trifluorotoluene	99	43-114
Bromobenzene	105	47-112

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

Curtis & Tompkins Ltd

Curtis & Tompkins, Ltd

8010/8020 Laboratory Control Sample Report [Quant Column]

Date Analyzed: 05-MAR-96
Matrix: WATER
Batch No: 26267 326065168005

LCS Datafile: 065W005
Operator: AMP
GC ID: GC12

EPA METHOD 8010: HALOGENATED VOLATILE ORGANICS

	Instrdg	SpikeAmt	% Rec	Limits
1,1-Dichloroethene	17.7	20	89 %	68-134%
Trichloroethene	19.0	20	95 %	85-141%
Chlorobenzene	18.9	20	95 %	69-135%
Surrogate Recovery				
Bromobenzene	98.7	100	99 %	85-119%

EPA METHOD 8020: AROMATIC VOLATILE ORGANICS

Benzene	19.1	20	95 %	88-118%
Toluene	18.3	20	92 %	85-119%
Chlorobenzene	19.6	20	98 %	90-115%
Surrogate Recovery				
Bromobenzene	101.	100	101 %	81-124%

Column: Rtx 502.2
Water Limits based on LCS Data Generated 5/5/95
Soil Limits based on 3/90 SOW

Results within Specifications - PASS

Lab #: 124235

BATCH QC REPORT

BTXE

Client: OHM Remediation Services
Project#: 17486
Location: Former UST Sites DO 0024

Analysis Method: EPA 8020
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: 96-IRP15-SB01-S-248
Lab ID: 124235-001
Matrix: Soil
Batch#: 25713
Units: ug/Kg dry weight
Diln Fac: 1

Sample Date: 01/29/96
Received Date: 01/30/96
Prep Date: 02/02/96
Analysis Date: 02/02/96
Moisture: 12%

MS Lab ID: QC14289

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	113.6	<5.682	114.1	100	75-125
Toluene	113.6	<5.682	120.5	106	75-125
Ethylbenzene	113.6	<5.682	113	99	75-125
m,p-Xylenes	227.3	<5.682	229.5	101	75-125
o-Xylene	113.6	<5.682	120.9	106	75-125

Surrogate	%Rec	Limits
Trifluorotoluene	98	43-114
Bromobenzene	104	47-112

MSD Lab ID: QC14290

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	113.6	107.6	95	75-125	6	<20
Toluene	113.6	112.2	99	75-125	7	<20
Ethylbenzene	113.6	104.7	92	75-125	8	<20
m,p-Xylenes	227.3	216.7	95	75-125	6	<20
o-Xylene	113.6	113.1	100	75-125	7	<20

Surrogate	%Rec	Limits
Trifluorotoluene	99	43-114
Bromobenzene	105	47-112

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

Curtis & Tompkins Ltd

Lab #: 124626 BATCH QC REPORT

BTXE

Client: OHM Remediation Services	Analysis Method: EPA 8020
Project#: 17486	Prep Method: EPA 5030
Location: El Toro MCAS,Former UST	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ	Sample Date: 02/27/96
Lab ID: 124596-001	Received Date: 02/28/96
Matrix: Soil	Prep Date: 03/01/96
Batch#: 26204	Analysis Date: 03/01/96
Units: ug/Kg dry weight	Moisture: 14%
Diln Fac: 1	

MS Lab ID: QC16277

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	116.3	<5.814	125.6	108	75-125
Toluene	116.3	<5.814	124.4	107	75-125
Ethylbenzene	116.3	<5.814	112.8	97	75-125
m,p-Xylenes	232.6	<5.814	229.1	99	75-125
o-Xylene	116.3	<5.814	118.6	102	75-125

Surrogate	%Rec	Limits
Trifluorotoluene	88	58-130
Bromobenzene	76	62-131

MSD Lab ID: QC16278

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	116.3	124.4	107	75-125	1	<20
Toluene	116.3	124.4	107	75-125	0	<20
Ethylbenzene	116.3	115.1	99	75-125	2	<20
m,p-Xylenes	232.6	230.2	99	75-125	1	<20
o-Xylene	116.3	119.8	103	75-125	1	<20

Surrogate	%Rec	Limits
Trifluorotoluene	89	58-130
Bromobenzene	77	62-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

Appendix F
Nonhazardous Waste Manifest

CANDELARIA ENVIRONMENTAL CO.
BIOTREATMENT FACILITY
EPA ID # IRC 356613091

TITLE TRANSFER
&
HOLD HARMLESS STATEMENT

Upon acceptance and delivery of "nonhazardous** hydrocarbon contaminated soil" at the C.E.C. Biotreatment Facility, and receipt of payment in full, the Candelaria Environmental Co. fully indemnifies (generator) COMMANDING GENERAL (IAW)

for soil received from (site) MCAS-EL TORO, PO BOX 95001
SANTA ANA CA 92709-5001 on (date) 4/18/96
for any environmental releases or damages associated with Candelaria Environmental Company's management of the soil at the C.E.C. Biotreatment Facility.

Lois Candelaria

Candelaria Environmental Co.

** As defined by the Resource Conservation and Recovery Act (RCRA) and Title 22 of the California Code of Regulations, Article 11.

Appendix F
Nonhazardous Waste Manifest

CANDELARIA ENVIRONMENTAL CO.
BIOTREATMENT FACILITY
EPA ID # IRC 356613091

TITLE TRANSFER
&
HOLD HARMLESS STATEMENT

Upon acceptance and delivery of "nonhazardous** hydrocarbon contaminated soil" at the C.E.C. Biotreatment Facility, and receipt of payment in full, the Candelaria Environmental Co. fully indemnifies (generator) COMMANDING GENERAL (IAW)

for soil received from (site) MCAS-EL TORO, PO BOX 95001 SANTA ANA CA 92709-5001 on (date) 4/18/96 for any environmental releases or damages associated with Candelaria Environmental Company's management of the soil at the C.E.C. Biotreatment Facility.

Candelaria Environmental Co.

** As defined by the Resource Conservation and Recovery Act (RCRA) and Title 22 of the California Code of Regulations, Article 11.

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: C A 6 1 7 0 0 2 3 2 0 8

Manifest Document No.: 96010

2. Page 1 of 1

3. Generator's Name and Mailing Address:
Commanding General (IAW)
MCAS-El Toro, P.O. Box 95001
Santa Ana, CA 927095001

~~1748696010~~

4. Generator's Phone ( ) 714 726-2772

5. Transporter 1 Company Name: WEST COAST S&G
6. US EPA ID Number: CAD043655927

A. State Transporter's ID: 88822
B. Transporter 1 Phone: 714-5220282

7. Transporter 2 Company Name:
8. US EPA ID Number:

C. State Transporter's ID
D. Transporter 2 Phone

9. Designated Facility Name and Site Address:
Candeleria Environmental Svc
4001 Candeleria Lane
Anza, CA 92539

10. US EPA ID Number:

E. State Facility's ID: IRC356613091
F. Facility's Phone: (619) 941-3267

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)	001	DT	00018	Y
b.				
c.				
d.				

F. Additional Descriptions for Materials Listed Above: Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 463-0719 upon receipt

Emergency Contact # (714) 451-1660

G. Handling Codes for Wastes Listed Above: 4

15. Special Handling Instructions and Additional Information:
8:00 – 9:45 LOADING TIME

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: Eddie Benavente
Signature:
Date: Month Day Year 041896

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Steve Fuertstra
Signature:
Date: Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of the waste materials covered by this manifest except as noted in item 19
Printed/Typed Name
Signature
Month Day Year

WEIGHMASTER CERTIFICATE
THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

CANDELARIA WEIGHMASTER
DEPUTY
DATE 4/18/96
GROSS 40.69 TARE 13.20 NET 27.49 IN TONS
Weighed at 4001 Candelaria Lane, Anza, CA 92539

GENERATOR / TRANSPORTER / FACILITY

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No: C A 6 1 7 0 0 2 3 2 0 8	Manifest Document No. 95009	2. Page 1 of 1

3. Generator's Name and Mailing Address
Commanding General (IAW)
MCAS-El Toro, P.O. Box 95001
Santa Ana, CA 927095001
4. Generator's Phone ( ) 714 726-2772

~~1748596009~~

5. Transporter 1 Company Name	6. US EPA ID Number	A. State Transporter's ID 88822
West Coast S&G	CAD043655927	B. Transporter 1 Phone 714) 5220282
7. Transporter 2 Company Name	8. US EPA ID Number	C. State Transporter's ID
		D. Transporter 2 Phone

9. Designated Facility Name and Site Address
Candeleria Environmental Svc
4001 Candeleria Lane
Anza, CA 92539

10. US EPA ID Number

E. State Facility's ID: IRC356613091
F. Facility's Phone: (619) 941-3267

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)	001	DT	00018	Y
b.				
c.				
d.				

F. Additional Descriptions for Materials Listed Above: Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 63-0719 upon receipt

G. Handling Codes for Wastes Listed Above: 4

Emergency Contact # (714) 451-1660

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date Month Day Year
Eddie Benavente		04 18 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: James Jasper | Signature | Date

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Date

19. Discrepancy Indication Space

20. Facility Owner or Operator; Certification of receipt of the waste materials covered by this manifest except as noted in item 19.
Printed/Typed Name | Signature | Date Month Day Year

WEIGHMASTER CERTIFICATE
THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

CANDELARIA WEIGHMASTER
DEPUTY
DATE 4/18/96
GROSS 41.09 TARE 13.46 NET 27.63 IN TONS
Weighed at 4001 Candelaria Lane, Anza, CA

Vertical side labels: GENERATOR, TRANSPORTER, FACILITY

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.	CA6170023208
Manifest Document No.	96010
2. Page 1 of	1
3. Generator's Name and Mailing Address	Commanding General (IAW) MCAS-El Toro, P.O. Box 95001 Santa Ana, CA 927095001
	~~1748596010~~
4. Generator's Phone	714 726-2772
5. Transporter 1 Company Name	WEST COAST S&G
6. US EPA ID Number	CAD043655927
A. State Transporter's ID	88822
B. Transporter 1 Phone	714-5220282
7. Transporter 2 Company Name	
8. US EPA ID Number	
C. State Transporter's ID	
D. Transporter 2 Phone	
9. Designated Facility Name and Site Address	Candeleria Environmental Svc 4001 Candeleria Lane Anza, CA 92539
10. US EPA ID Number	
E. State Facility's ID	IRC356613091
F. Facility's Phone	(619) 941-3267

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)	001	DT	00018	Y
b.				
c.				
d.				

GENERATOR

F. Additional Descriptions for Materials Listed Above: Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 63-0719 upon receipt

G. Handling Codes for Wastes Listed Above: 4

Emergency Contact # (714) 451-1660

15. Special Handling Instructions and Additional Information

8:00 - 9:45 LOADING TIME

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date Month Day Year
Eddie Benavente	[signature]	04 18 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month Day Year
Steve Fluerstra	[signature]	4 18 96

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month Day Year

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

FACILITY

19. Discrepancy Indication Space

CANDELARIA WEIGHMASTER

DEPUTY [signature] DATE 4/18/96

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest except as noted in item 19.

GROSS 40.69 TARE 13.20 NET 27.49 IN TONS

Printed/Typed Name	Signature	Date Month Day Year
	Weighed at 4001 Candelaria Lane, Anza, CA 92539	

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No. CA6170023208	Manifest Document No. 96009	2. Page 1 of 1

3. Generator's Name and Mailing Address
Commanding General (IAW)
MCAS-El Toro, P.O. Box 95001
Santa Ana, CA 927095001

1748696009

4. Generator's Phone ( ) 714 726-2772

5. Transporter 1 Company Name: West Coast S&G	6. US EPA ID Number: CAD043655927	A. State Transporter's ID 88822
		B. Transporter 1 Phone 714) 5280282
7. Transporter 2 Company Name	8. US EPA ID Number	C. State Transporter's ID
		D. Transporter 2 Phone
9. Designated Facility Name and Site Address: Candeleria Environmental Svc, 4001 Candeleria Lane, Anza, CA 92539	10. US EPA ID Number	E. State Facility's ID IRC356613091
		F. Facility's Phone (619) 941-3267

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)	001	DT	00018	Y
b.				
c.				
d.				

G. Additional Descriptions for Materials Listed Above: Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 63-0719 upon receipt

H. Handling Codes for Wastes Listed Above: 4

Emergency Contact # (714) 451-1660

15. Special Handling Instructions and Additional Information

GENERATOR

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date Month Day Year
Eddie Benavente		04 18 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month Day Year
James Jasper		

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month Day Year

WEIGHMASTER CERTIFICATE
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CANDELARIA WEIGHMASTER
DEPUTY
DATE 4/18/96
GROSS 41.09 TARE 13.46 NET 27.63 IN TONS
Weighed at 4001 Candelaria Lane, Anza, CA

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest except as noted in item 19.

Printed/Typed Name	Signature	Date Month Day Year

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No: CA6170023208

Manifest Document No. 96010

2. Page 1 of 1

~~1748696010~~

3. Generator's Name and Mailing Address
Commanding General (IAW)
MCAS-El Toro, P.O. Box 95001
Santa Ana, CA 927095001

4. Generator's Phone ( ) 714 726-2772

5. Transporter 1 Company Name: WEST COAST S&G

6. US EPA ID Number: CAD043655927

A. State Transporter's ID: 88822

B. Transporter 1 Phone: 714-5220282

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address
Candeleria Environmental Svc
4001 Candeleria Lane
Anza, CA 92539

10. US EPA ID Number

E. State Facility's ID: IRC356613091

F. Facility's Phone: (619) 941-3267

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)	001	DT	00018	Y
b.				
c.				
d.				

F. Additional Descriptions for Materials Listed Above
Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 463-0719 upon receipt

G. Handling Codes for Wastes Listed Above
4

Emergency Contact # (714) 451-1660

15. Special Handling Instructions and Additional Information

8:00 - 9:45 LOADING TIME

GENERATOR

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: Eddie Benavente | Signature: [signature] | Date Month Day Year: 041896

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Steve FLUITSTRA | Signature: [signature] | Date Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Date Month Day Year

WEIGHMASTER CERTIFICATE
THIS IS TO CERTIFY that the following described commodity was weighed, measured or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

FACILITY

19. Discrepancy Indication Space

CANDELARIA WEIGHMASTER
DEPUTY [signature] DATE 4/18/96
GROSS 40.69 TARE 13.20 NET 27.49 IN TONS
Weighed at 4001 Candelaria Lane, Anza, CA 92539

20. Facility Owner or Operator Certification of receipt of the waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Date Month Day Year

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No CA 6 1 7 0 0 2 3 2 0 8	Manifest Document No. 96009	2. Page 1 of 1

3. Generator's Name and Mailing Address
Commanding General (IAW)
MCAS-El Toro, P.O. Box 95001
Santa Ana, CA 927095001
4. Generator's Phone ( ) 714 726-2772

1748696009

5. Transporter 1 Company Name	6. US EPA ID Number	
West Coast S&G	CAD043655927	A. State Transporter's ID 88822
		B. Transporter 1 Phone 714) 5220282
7. Transporter 2 Company Name	8. US EPA ID Number	C. State Transporter's ID
		D. Transporter 2 Phone
9. Designated Facility Name and Site Address	10. US EPA ID Number	E. State Facility's ID IRC356613091
Candeleria Environmental Svc 4001 Candeleria Lane Anza, CA 92539		F. Facility's Phone (619) 941-3267

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)	001	DT	00018	Y
b.				
c.				
d.				

GENERATOR

F. Additional Descriptions for Materials Listed Above Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 63-0719 upon receipt

G. Handling Codes for Wastes Listed Above 4

Emergency Contact # (714) 451-1660

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date Month Day Year
Eddie Benavente		04 18 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials		
Printed/Typed Name James Jasper	Signature	Date
18. Transporter 2 Acknowledgement of Receipt of Materials		
Printed/Typed Name	Signature	Date Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator; Certification of receipt of the waste materials covered by this manifest except as noted in item 19.

Printed/Typed Name	Signature	Date Month Day Year

WEIGHMASTER CERTIFICATE
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CANDELARIA WEIGHMASTER
DEPUTY DATE 4/18/96
GROSS 41.09 TARE 13.46 NET 27.63 IN TONS
Weighed at 4001 Candelaria Lane, Anza, CA

ID: MAY 02 96 9:37 NO.001 P.04

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No: C A 6 1 7 0 0 2 3 2 0 8

Manifest Document No. 95008

2. Page 1 of 1

3. Generator's Name and Mailing Address
Commanding General (IAW)
MCAS-El Toro, P.O. Box 95001
Santa Ana, CA 927095001

1748595008

4. Generator's Phone ( ) 714 726-2772

5. Transporter 1 Company Name: West Coast S&G

6. US EPA ID Number: CAD043653927

A. State Transporter's ID: 88822

B. Transporter 1 Phone: 714-522-0282

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address
Candeleria Environmental Svc
4001 Candeleria Lane
Anza, CA 92539

10. US EPA ID Number

E. State Facility's ID: IRC356613091

F. Facility's Phone: (619) 941-3267

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)	001	DT	00018	Y
b.				
c.				
d.				

F. Additional Descriptions for Materials Listed Above: Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 462-0719 upon receipt

Emergency Contact # (714) 451-1660

G. Handling Codes for Wastes Listed Above: 4

15. Special Handling Instructions and Additional Information

GENERATOR

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations

Printed/Typed Name: Eddie Benavente

Signature

Date: Month 04 Day 18 Year 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Daniel A. Flietstra

Signature

Date: Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Date: Month Day Year

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

FACILITY

19. Discrepancy Indication Space

CANDELARIA WEIGHMASTER

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest except as noted in Item 19.

DEPUTY

DATE 4/18/96

GROSS 35.35 TARE 13.38 NET 21.97 IN TONS

Printed/Typed Name

Signature

Date: Month Day Year

Weighed at 4001 Candelaria Lane, Anza, CA 92539

F14 Printed by Labelmaster. An American Labelmark Co., Chicago, IL 60646 (800) 621 5808

PRINTED ON RECYCLED PAPER USING SOYBEAN INK

Rev. 3/95

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No. CA6170023208	Manifest Document No. 96006	2. Page 1 of 1

3. Generator's Name and Mailing Address
Commanding General (IAW)
MCAS-El Toro, P.O. Box 95001
Santa Ana, CA 927095001
4. Generator's Phone ( ) 714 726-2772

1748696006

5. Transporter 1 Company Name: West Coast S&G	6. US EPA ID Number: CAD043655927	A. State Transporter's ID: 88822
		B. Transporter 1 Phone: 714-522-0282
7. Transporter 2 Company Name	8. US EPA ID Number	C. State Transporter's ID
		D. Transporter 2 Phone
9. Designated Facility Name and Site Address: Candeleria Environmental Svc, 4001 Candeleria Lane, Anza, CA 92539	10. US EPA ID Number	E. State Facility's ID: IRC356613091
		F. Facility's Phone: (619) 941-3267

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)	001	DT	00018	Y
b.				
c.				
d.				

GENERATOR

F. Additional Descriptions for Materials Listed Above: Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 463-0719 upon receipt

Emergency Contact # (714) 451-1660

G. Handling Codes for Wastes Listed Above: 4

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: Eddie Benavente | Signature: [signature] | Date: Month 04 Day 18 Year 96

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Date

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Date

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator; Certification of receipt of the waste materials covered by this manifest, except as noted in Item 19.
Printed/Typed Name | Signature | Date

WEIGHMASTER CERTIFICATE
THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurements Standards of the California Department of Food and Agriculture.

CANDELARIA WEIGHMASTER

DEPUTY [signature] DATE 4/18/96

GROSS 39.71 TARE 13.48 NET 26.23 IN TONS

Weighed at 4001 Candelaria Lane, Anza, CA 92539

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. C A 6 1 7 0 0 2 3 2 0 8

Manifest Document No. 96007

2. Page 1 of 1

3. Generator's Name and Mailing Address
Commanding General (IAW)
MCAS-El Toro, P.O. Box 95001
Santa Ana, CA 927095001

1748696007

4. Generator's Phone (714) 726-2772

5. Transporter 1 Company Name: WEST COAST
6. US EPA ID Number: CAD043655927

A. State Transporter's ID: 88822
B. Transporter 1 Phone: 714-522-0282

7. Transporter 2 Company Name
8. US EPA ID Number

C. State Transporter's ID
D. Transporter 2 Phone

9. Designated Facility Name and Site Address
Candeleria Environmental Svc
4001 Candeleria Lane
Anza, CA 92539

10. US EPA ID Number

E. State Facility's ID: IRC356613091
F. Facility's Phone: (619) 941-3267

11. WASTE DESCRIPTION	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non-hazardous waste, solid (motor oil and diesel fuel impacted soils)	001	DT	00018	Y
b.				
c.				
d.				

F. Additional Descriptions for Materials Listed Above
Project #17486; fax facility signed manifests to ATTN: Brionne Bischke at fax # (510) 463-0719 upon receipt

G. Handling Codes for Wastes Listed Above

Emergency Contact # (714) 451-1660

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name: Eddie Benavente
Signature
Date Month Day Year: [illegible] 18 96

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Greg Aiker
Signature
Date Month Day Year: 6 18 96

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Date Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator; Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name
Signature
Date Month Day Year

WEIGHMASTER CERTIFICATE
THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

CANDELARIA
WEIGHMASTER
DEPUTY DATE 6/18/96
GROSS 38.37 TARE 20.66 NET [illegible] IN TONS
Weighed at 4001 Candelaria Lane, Anza, CA 92539

Appendix G
Data Quality Assessment Report

1.1 Introduction

A data quality assessment (DQA) was performed on the soil and water samples collected from former Installation Restoration Program (IRP) Site 15, Unit 1 at Marine Corps Air Station (MCAS) El Toro, California. The purpose of the DQA is to determine whether the data are of acceptable quality for its intended usage.

Samples from the site were collected and analyzed for total petroleum hydrocarbons (TPH) for gasoline; TPH for JP-4; JP-5; diesel; hydraulic oil and/or motor oil; and benzene, toluene, ethylbenzene, and total xylenes (BTEX).

Analyses were performed according to United States Environmental Protection Agency (EPA) SW846 Methods and California Leaking Underground Fuel (CA LUFT) Tank Manual. The equivalent of EPA Level 3 data validation was performed on 100 percent of the data.

Analytical results were qualified based upon compliance with method protocols, and the *National Functional Guidelines for Organic and Inorganic Data Review* (EPA, 1994). Qualifiers included in the DQA are "U" as not detected, "UJ" as not detected with uncertainty in the reporting limits, "R" as rejected, and "J" as estimated.

1.2 Total Petroleum Hydrocarbons as Diesel, JP-5, Hydraulic Oil, or Motor Oil Ranges

Fourteen soil samples and two equipment rinsate samples were analyzed for TPH as diesel, JP-5, hydraulic oil, or motor oil ranges in accordance with the CA LUFT method.

- **Holding Times** — All samples were extracted and analyzed within the holding times.
- **Laboratory Blanks** — Method blanks were performed at the required frequencies and were free of the target analyte.
- **Instrument Calibration** — Initial calibration was performed as required by the method. Correlation coefficient (r) of the initial calibration was greater than 0.995 as stated in the method for diesel; however, a single point calibration was used for JP-5, hydraulic oil, and motor oil. Continuing calibration verifications were performed at the required frequencies and were within quality control limits.
- **Laboratory Control Sample/Laboratory Control Sample Duplicate** — The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) are used to monitor the overall accuracy and precision of the analytical measurement process. The LCS/LCSD were analyzed at the appropriate frequencies and were within quality control limits.

- **Matrix Spike/Matrix Spike Duplicate** — The matrix spike/matrix spike duplicate (MS/MSD) measures precision and assesses matrix effects. The MS/MSD recoveries and relative percent differences were within the quality control limits.
- **Surrogate** — The surrogates were added to the samples, and their recoveries were within the quality control limits.
- **Summary** — The data quality of the TPH as diesel, JP-5, hydraulic oil, or motor oil ranges analysis was acceptable and the results were considered usable. Overall precision, accuracy, and completeness objectives were met.

1.3 Total Petroleum Hydrocarbons as Gasoline and JP-4 Ranges

Fourteen soil samples and two equipment rinsate samples were analyzed for TPH as gasoline and JP-4 ranges in accordance with the CA LUFT method.

- **Holding Times** — All samples were extracted and analyzed within the holding times.
- **Laboratory Blanks** — Method blanks were performed at the required frequencies and were free of the TPH as gasoline and JP-4 ranges.
- **Instrument Calibration** — Initial calibration was performed as required by the method. The percent relative standard deviation of calibration factors were less than 20 percent. Continuing calibration verifications were performed at the required frequencies. The percent differences of the calibration factors was within the 15 percent quality control limit.
- **Laboratory Control Sample/laboratory Control Sample Duplicate** — The LCS/LCSD are used to monitor the overall accuracy and precision of the analytical measurement process. The LCS/LCSD were analyzed at the appropriate frequencies and were within quality control limits.
- **Matrix Spike/Matrix Spike Duplicate** — The MS/MSD measures precision and assesses matrix effects. MS/MSD were not performed on the IRP 15 samples. LCS/LCSD were performed in place of MS/MSD.
- **Surrogate** — The surrogates were added to the samples and their recoveries were within the quality control limits.
- **Summary** — The data quality of the TPH as gasoline and JP-4 ranges analysis was acceptable and the results were considered usable. Overall precision, accuracy, and completeness objectives were met.

1.4 Benzene, Toluene, Ethylbenzene, and Total Xylenes

Fourteen soil samples, one trip blank sample, and two equipment rinsate samples were collected for benzene, toluene, ethylbenzene, and total xylenes (BTEX) in accordance with EPA Method 8020.

- **Holding Times** — All samples were extracted and analyzed within the holding times.
- **Laboratory Blanks** — Method blanks were performed at the required frequencies and were free of the target analytes.
- **Instrument Calibration** — Initial calibration was performed as required by the method. The percent relative standard deviation of calibration factors were less than 20 percent. Continuing calibration verifications were performed at the required frequencies. The percent differences of the calibration factors were within the 15 percent quality control limits.
- **Laboratory Control Sample/Laboratory Control Sample Duplicate** — The LCS/LCSD are used to monitor the overall accuracy and precision of the analytical measurement process. The LCS/LCSD were analyzed at the appropriate frequencies and were within quality control limits.
- **Matrix Spike/Matrix Spike Duplicate** — The MS/MSD measures precision and assesses matrix effects. The MS/MSD recoveries and relative percent differences were within the quality control limits.
- **Surrogate** — The surrogates were added to the samples, and their recoveries were within the quality control limits.
- **Summary** — The data quality of the BTEX analysis was acceptable and the results were considered usable. A trip blank was collected, analyzed, and was free of target analytes. Overall precision, accuracy, and completeness objectives were met.

Appendix H
Land Surveying Data

APPENDIX K
EXCERPTS FROM THE CLOSURE REPORT FOR TAA 31B

OHM Remediation
Services Corp.

1230 Columbia Street, Suite 1200
San Diego, California 92101

Temporary Accumulation Area 31B
Marine Corps Air Station
El Toro, California

SWDIV Contract No. N68711-93-D-1459
Delivery Order No. 0070 – Revision 0
OHM Project No. 18609 – Document Control No. SW9638
March 23, 2001

Closure Report

Appendix A - BNI VSI Evaluation Report; Appendix B -Site Photographs;
Appendix C - Site Assessment Log; Appendix D - Land Survey Data; Appendix E - Laboratory Analytical Reports;
Appendix F - LDC Data Validation Report; Appendix G - Tentative Reuse Parcel Location of TAA 31B

Section 6
Conclusions and Recommendations

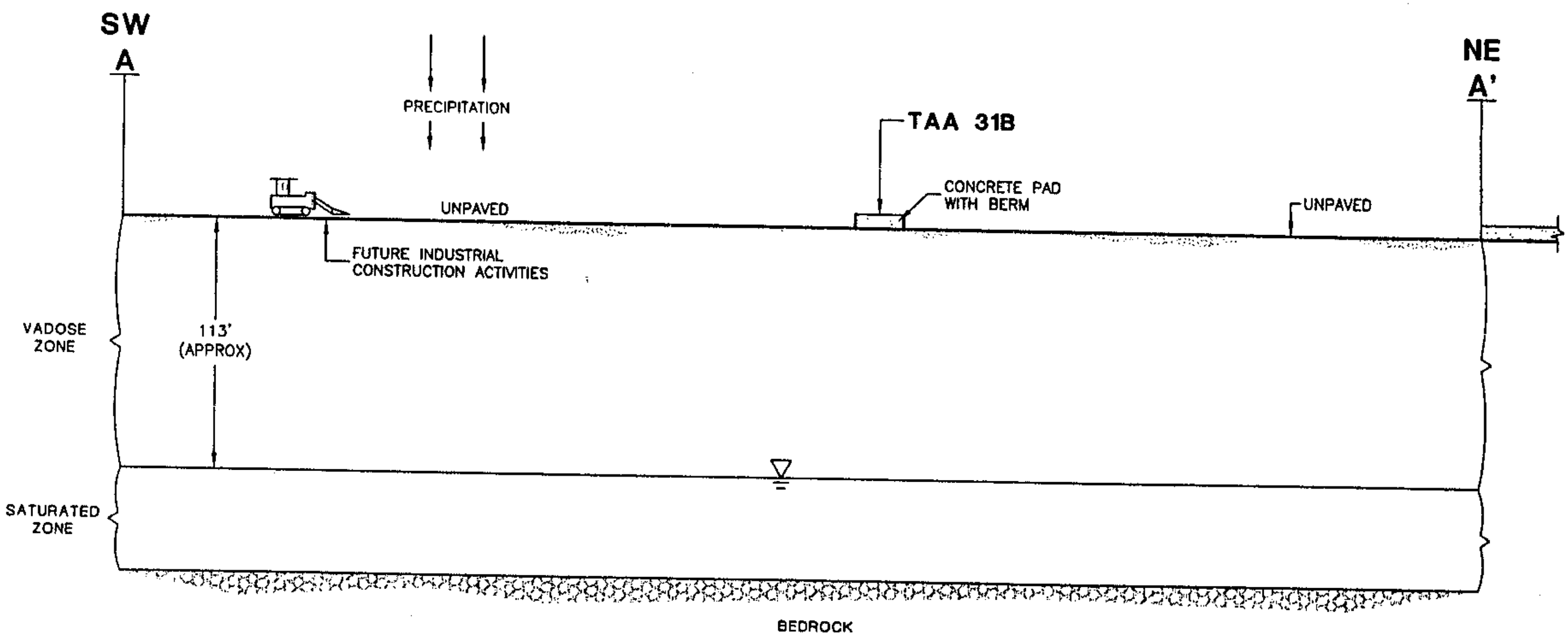
The following conclusions are based upon existing background information, previous field investigations, and OHM's confirmation soil sampling analytical results and screening level risk assessment calculations:

- BNI in December 1994 conducted a site inspection and identified storage of seven drums and a large drum rack at TAA 31B. BNI performed no soil sampling at TAA 31B.
- OHM collected 13 confirmation soil samples from six hand augur borings at TAA 31B. Pesticides (below PRGs), arsenic (above residential PRG) and low concentrations of pesticides and metals (below PRGs) were found in the soil around TAA 31B. The concentration of metals detected in soil samples was generally above the background. Based on the review of analytical data, there was no indication of hazardous contaminants from previous spills or handling of hazardous wastes. Health risk calculations were conducted which indicate that the use of the HWSA did not impact the soil at TAA 31B.
- The detected carcinogens in soil include arsenic, chromium, beryllium, heptachlor, 4,4'-DDE, and 4,4'-DDT, and none of these were detected above background concentrations. Compounds that were detected at TAA 31B that contribute to the non-cancer HI include aluminum, barium, beryllium, cobalt, copper, iron, lead, manganese, zinc and heptachlor.
- The residential and industrial risk calculations for TAA 31B resulted in a site-related net cancer risk less background risk of less than 10^{-6}. The industrial non-cancer HI is less than 1.0. The residential non-cancer HI is less than 1.0 for identified target organs except for soft tissue. The only contributor to the HI for soft tissue is iron at 1.2. This HI is determined to be acceptable because iron only exceeded the PRG in 1 of 12 samples and the average concentration of iron is less than background and the PRG.

The objectives of this project are considered to be achieved, since TAA 31B is no longer used for storage of hazardous waste drums. Confirmation soil sampling was conducted at TAA 31B to verify that concentrations of contaminants were at or below acceptable background or health-risk based concentrations.

Based on the information provided, closure goals were achieved with respect to soil for TAA 31B; therefore, TAA 31B should be identified as "closed."

Mar 05, 2001 – 15:18:54 I:\OHM CORP\PROJECTS\18609\18609365C.dwg



EXPLANATION:

RECEPTORS:

WORKERS

PATHWAYS:

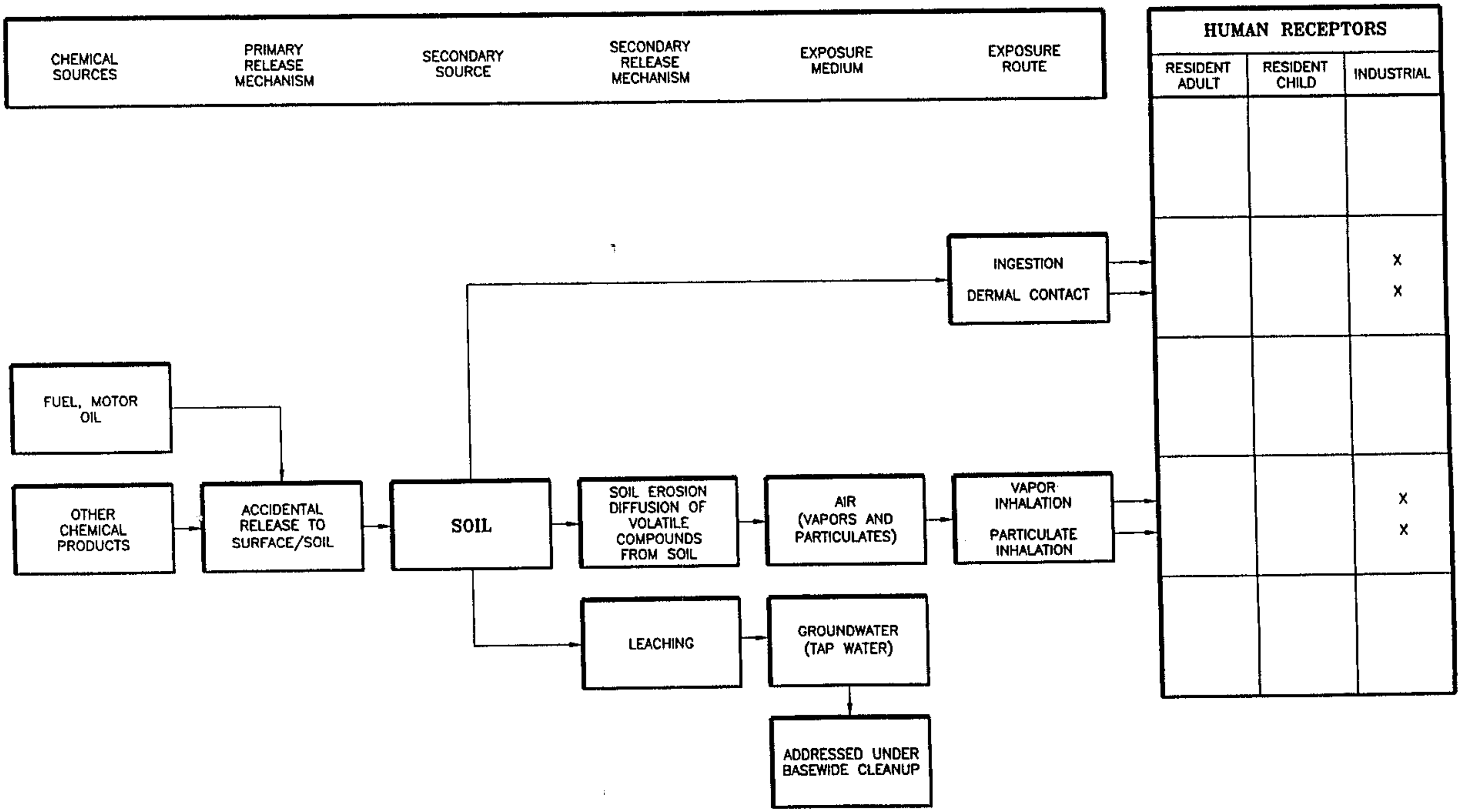
GROUNDWATER

PRECIPITATION

REFERENCE:
103M2088.DWG

OHM Remediation Services Corp. A Subsidiary of OHM Corporation SAN DIEGO, CA	DRAWN BY R. PIRMORADIAN	DATE 3/5/01	CONCEPTUAL SITE MODEL TAA 31B		
	CHECKED BY T. Waters	DATE 3/19/01			
CONTRACT NAME SWDIV	APPROVED BY	DATE 3/19/01	MARINE CORPS AIR STATION EL TORO, CALIFORNIA		
	PROJECT MANAGER	DATE			
AUTOCAD FILE No. 18609365C.DWG	PLOT SCALE 1=1	SHEET 1 OF 1	SCALE NONE	DOCUMENT CONTROL No. SW9638	OHM PROJECT No. 18609 / FIGURE No. FIG 5-1

Mar 05, 2001 – 15:19:50 I:\OHM CORP\PROJECTS\18609\18609365D.dwg



EXPLANATION:

X COMPLETE PATHWAY

REFERENCE:
103C2089.DXF

OHM Remediation Services Corp. A Subsidiary of OHM Corporation SAN DIEGO, CA		DRAWN BY R. PIRMORADIAN	DATE 3/5/01	POTENTIAL MIGRATION PATHWAYS, EXPOSURE ROUTES AND RECEPTORS TAA 31B	
		CHECKED BY T. Walters	DATE 3/19/01		
		APPROVED BY	DATE 3/19/01		
CONTRACT NAME SWDIV		PROJECT MANAGER	DATE	MARINE CORPS AIR STATION EL TORO, CALIFORNIA	
AUTOCAD FILE No. 18609365D.DWG	PLOT SCALE 1=1	SHEET 1	OF 1	SCALE NONE	DOCUMENT CONTROL No. SW9638
OHM PROJECT No. 18609	FIGURE No. FIG 5-2				

Table 5-1
Residential Risk Screening Worksheet for Soil - TAA 31B

Detected Chemical	Maximum TAA 31B Soil Concentration (mg/kg)	MCAS El Toro Background Concentrations[a] (mg/kg)	CANCER			NON-CANCER	
			Residential PRG[b] (mg/kg)	TAA 31B Maximum Ratio[c]	MCAS El Toro Background Ratio[d]	Residential PRG[e] (mg/kg)	TAA 31B Maximum Ratio[f]
ORGANICS							
Heptachlor	0.002	NE	1.1E-01	1.8E-02	1.8E-02	3.1E+01	6.5E-05
4, 4'-DDE	0.1	0.145	1.7E+00	5.9E-02	5.9E-02	NE	NE
4, 4'-DDT	0.17	0.236	1.7E+00	1.0E-01	1.0E-01	3.6E+01	NE
METALS							
Aluminum	23,600	14,800	NE	NE	NE	7.6E+04	3.1E-01
Arsenic	5.43	6.86	3.9E-01	1.4E+01	1.4E+01	2.2E+01	NE
Barium	258	173	NE	NE	NE	5.4E+03	4.8E-02
Beryllium	0.878	0.669	1.1E+03	8.0E-04	6.1E-04	1.5E+02	5.9E-03
Chromium	20.8	26.9	2.1E+02	9.9E-02	9.9E-02	2.3E+02	NE
Cobalt	10.7	6.98	NE	NE	NE	4.7E+03	2.3E-03
Copper	14	10.5	NE	NE	NE	2.9E+03	4.8E-03
Iron	27,800	18,400	NE	NE	NE	2.3E+04	1.2E+00
Lead	35.8	15.1	NE	NE	NE	4.0E+02	9.0E-02
Manganese	396	291	NE	NE	NE	1.8E+03	2.2E-01
Nickel	9.28	15.3	NE	NE	NE	1.5E+02	NE
Vanadium	61.9	71.8	NE	NE	NE	5.5E+02	NE
Zinc	98.6	77.9	NE	NE	NE	2.3E+04	4.3E-03
Subtotal sum of ratios				1.4E+01	1.4E+01		1.9E+00
MCAS EL TORO BACKGROUND RISK			CANCER RISK		1.4E-05		
TAA 31B SUMMED RISK			CANCER RISK	1.4E-05		NON-CANCER HAZARD INDEX	1.9E+00
TAA 31B RISK LESS BACKGROUND RISK (NET RISK			NET CANCER RISK	$<1x10^{-6}$			

[a] *MCAS El Toro Background upper threshold limit concentrations from Final Technical Memorandum Background and Reference Levels, Bechtel National, Inc. 1996b.*

[b] *Residential soil PRG for cancer from the EPA Region 9, November 1, 2000 list.*

[c] *The Ratio is determined by dividing the maximum concentration by the respective PRG.*

[d] *Where the background concentration exceeds the maximum concentration the background ratio was defaulted to the maximum ratio.*

[e] *Residential soil PRG for non-cancer from the EPA Region 9, November 1, 2000 list.*

[f] *The Ratio is determined by dividing the maximum concentration by the respective PRG. No ratios were calculated for chemicals detected below background levels.*

mg/kg - Milligrams per kilogram.
NE - Not established/No entry.
PRG - Preliminary remediation goal.

Table 5-2
Industrial Risk Screening Worksheet for Soil - TAA 31B

Detected Chemical	Maximum TAA 31B Soil Concentration (mg/kg)	MCAS El Toro Background Concentration[a] (mg/kg)	CANCER: Industrial PRG[b] (mg/kg)	CANCER: TAA 31B Maximum Ratio[c]	CANCER: MCAS El Toro Background Ratio[d]	NON-CANCER: Industrial PRG[e] (mg/kg)	NON-CANCER: TAA 31B Maximum Ratio[f]
ORGANICS							
Heptachlor	0.002	NE	5.5E-01	3.6E-03	3.6E-03	4.4E+02	NE
4, 4'-DDE	0.1	0.145	1.2E+01	8.3E-03	8.3E-03	NE	NE
4, 4'-DDT	0.17	0.236	1.2E+01	1.4E-02	1.4E-02	7.3E+02	NE
METALS							
Aluminum	23,600	14,800	NE	NE	NE	1.0E+05	2.4E-01
Arsenic	5.43	6.86	2.7E+00	2.0E+00	2.0E+00	4.4E+02	NE
Barium	258	173	NE	NE	NE	1.0E+05	2.6E-03
Beryllium	0.878	0.669	3.7E+03	2.4E-04	1.8E-04	2.2E+03	4.0E-04
Chromium	20.8	26.9	4.5E+02	4.6E-02	4.6E-02	6.1E+03	NE
Cobalt	10.7	6.98	NE	NE	NE	1.0E+05	1.1E-04
Copper	14	10.5	NE	NE	NE	7.6E+04	1.8E-04
Iron	27,800	18,400	NE	NE	NE	1.0E+05	2.8E-01
Lead	35.8	15.1	NE	NE	NE	7.5E+02	4.8E-02
Manganese	396	291	NE	NE	NE	3.2E+04	1.2E-02
Nickel	9.28	15.3	NE	NE	NE	4.1E+04	NE
Vanadium	61.9	71.8	NE	NE	NE	1.4E+04	NE
Zinc	98.6	77.9	NE	NE	NE	1.0E+05	9.9E-04
Subtotal sum of ratios				2.1E+00	2.1E+00		5.8E-01
MCAS EL TORO BACKGROUND RISK			**CANCER RISK**		**2.1E-06**		
TAA 31B SUMMED RISK			**CANCER RISK**	**2.1E-06**		**NON-CANCER HAZARD INDEX**	**<1.0**
TAA 31B RISK LESS BACKGROUND RISK (NET RISK)			**NET CANCER RISK**	**$<1x10^{-6}$**			

[a] *MCAS El Toro Background upper threshold limit concentrations from Final Technical Memorandum Background and Reference Levels, Bechtel National, Inc. 1996b.*

[b] *Industrial soil PRG for cancer from the EPA Region 9, November 1, 2000 list.*

[c] *The Ratio is determined by dividing the maximum concentration by the respective PRG.*

[d] *Where the background concentration exceeds the maximum concentration the background ratio was defaulted to the maximum ratio.*

[e] *Industrial soil PRG for non-cancer from the EPA Region 9, November 1, 2000 list.*

[f] *The Ratio is determined by dividing the maximum concentration by the respective PRG. No ratios were calculated for chemicals detected below background levels.*

mg/kg - Milligrams per kilogram.
NE - Not established/No entry.
PRG - Preliminary remediation goal.

Table 5-3
Target Organ System Endpoint -TAA 31B

Detected Chemical	Maximum TAA 31B Soil Concentration (mg/kg)	MCAS El Toro Background Concentration[a] (mg/kg)	Residential PRG[b] (mg/kg)	TAA 31B Maximum Ratio[c]	Target Organ Hazard Index[d]			
					Soft Tissue	Central Nervous System	Respiratory Tract	Repro-ductive System
METAL CONTRIBUTORS								
Aluminum	23,600	14,800	7.6E+04	3.1E-01		3.11E-01	3.11E-01	
Iron	27,800	18,400	2.3E+04	1.2E+00	1.21E+00			
Manganese	396	291	1.8E+03	2.2E-01		2.20E-01	2.20E-01	2.20E-01
Subtotal sum of ratios				1.74E+00	1.21E+00	5.31E-01	5.31E-01	2.20E-01
			NON-CANCER HAZARD INDEX	1.7	1.2	0.5	0.5	0.2

[a] *MCAS El Toro Background upper threshold limit concentrations from Final Technical Memorandum Background and Reference Levels, Bechtel National, Inc. 1996b.*

[b] *Residential soil PRGs for non-cancer from the EPA Region 9, November 1, 2000 list.*

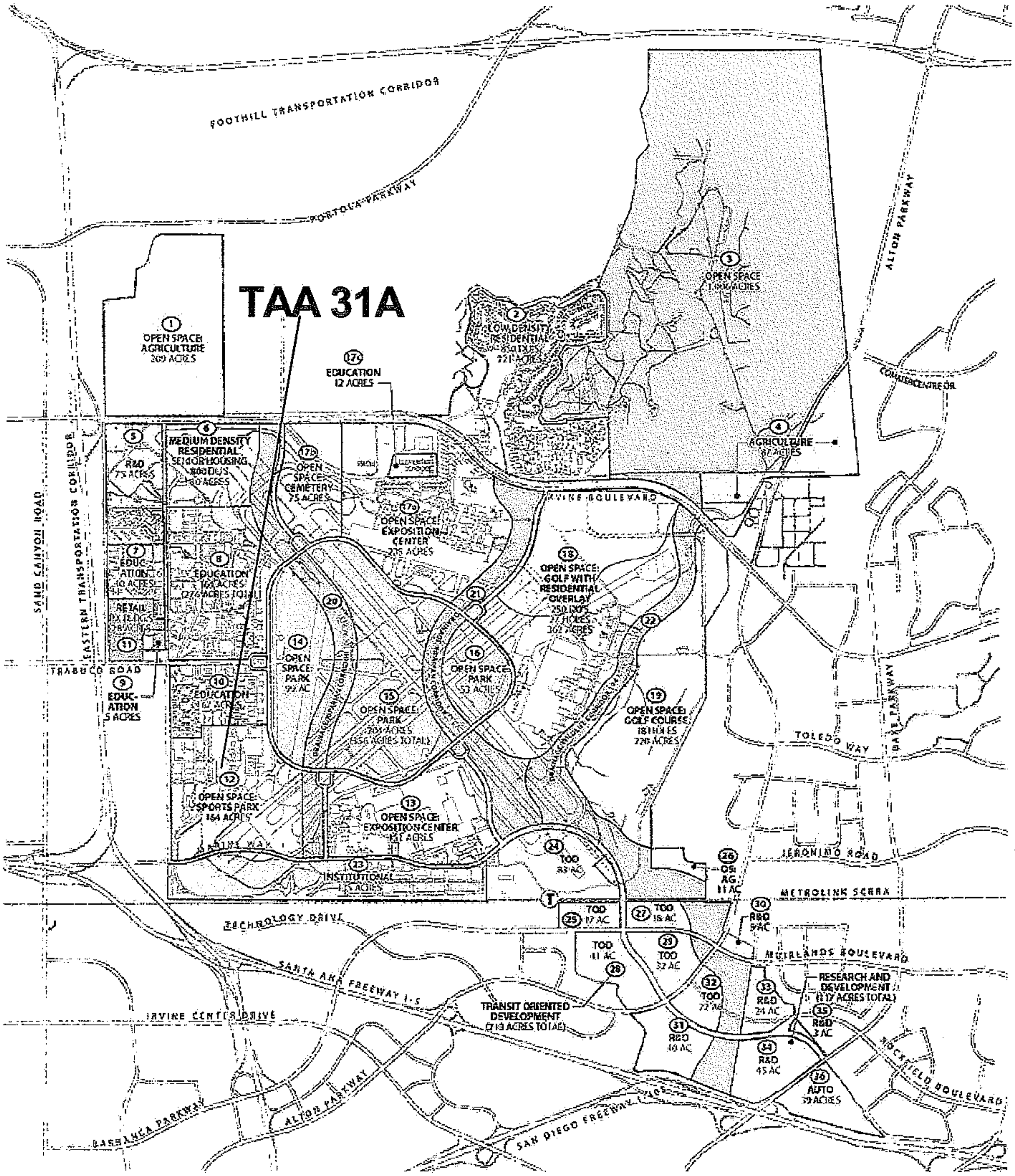
[c] *The Ratio is determined by dividing the maximum concentration by the respective PRG.*

[d] *The primary target organs were identified from toxicity profiles available on the Risk Assessment Information System website or IRIS.*

mg/kg - Milligrams per kilogram.

PRG - Preliminary remediation goal.

APPENDIX B
GREAT PARK LAND USE PLAN

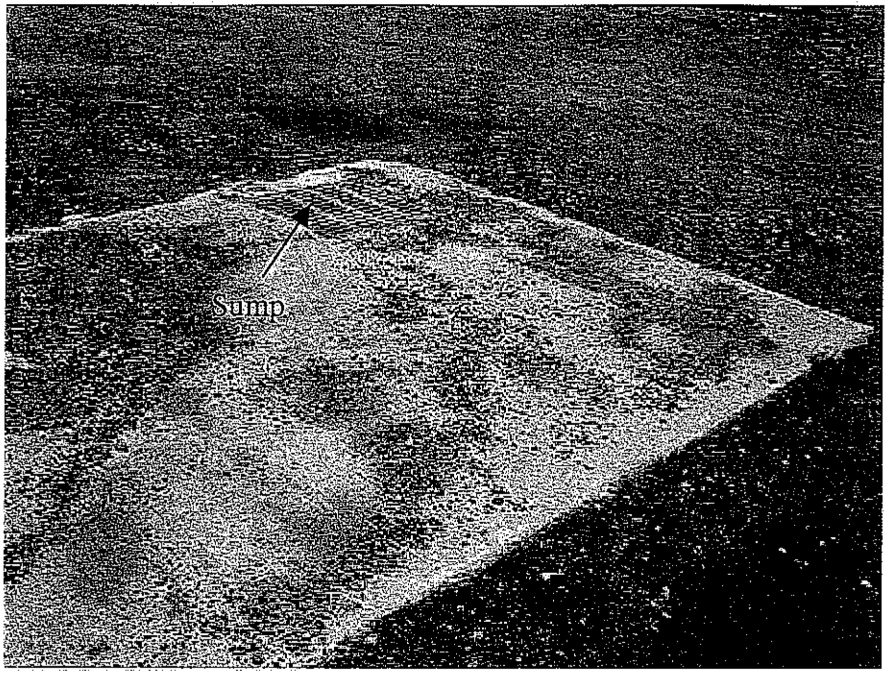


Great Park Land Use Plan

The Orange County Great Park

June 12, 2002

APPENDIX C
SITE PHOTO LOG



TAA 31A with sump


Soil boring location next to sump at TAA 31A

APPENDIX D
LABORATORY ANALYTICAL REPORT

the IT group
IT Corporation
2790 Mosside Blvd.
Monroeville, PA 15146-2792
(412)372-7701

CHAIN-OF-CUSTODY RECORD

PROJECT DATA MANAGER'S COPY

A 14695

FORM 0019 REV. 9-99

02-K106

IT'S LAB COORDINATOR	LAB COORDINATOR'S PHONE	LAB COORDINATOR'S FAX	LABORATORY SERVICE ID	LABORATORY CONTACT	MAIL REPORT (COMPANY NAME)
Lynn Jefferson	949-660-7587	949-475-5433	EMAX	Ye Myint	Shaw E+I

PROJECT NAME:	PROJECT LOCATION	PROJECT NUMBER	LABORATORY PHONE	LABORATORY FAX	RECIPIENT NAME
MCAS El Toro	MCAS El Toro	818655	310-618-8889	—	Dwayne Ishida

PROJECT CONTACT	PROJECT PHONE NUMBER	PROJECT FAX	LABORATORY ADDRESS	ADDRESS
Dhananjay Rawal	949-660-7576	949-474-8309	1835 W. 205th st.	3347 Michelson Dr. #200

PROJECT ADDRESS	CITY, STATE AND ZIP CODE	CLIENT	CITY, STATE AND ZIP CODE	CITY, STATE AND ZIP CODE
MCAS El Toro	Santa Ana, CA	EFA West	Torrance, CA 90501	Irvine, CA 92612

PROJECT MANAGER	PROJECT MANAGER'S PHONE	PROJECT MANAGER'S FAX
Dhananjay Rawal	949-660-7576	949-474-8309

Sample Identifier	Matrix	Date	Time	Preserved	# of Cont.	QC Level	T.A.T.	8260B (VOCs)	SVOC+Sims (8270)	8015 (Gas)	8015 (Diesel)	8081 (Pesticides)	8082 (PCB)	6010 (metals)		Comments
818655-B3103	S	1/12	1010	4°C	2	3	5 day	x	x	x	x	x	x	x		No Sims. only SVOC for 8270 Composite
818655-B3104	S		1100	4°C	2	3	5 day	x	x	x	x	x	x	x		No Sims only SVOC for 8270
818655-B3105	W		1000	4°C	3	3	5 day	x								
818655-B3106	S		1110	4°C	7	3	5 day	x	x	x	x	x	x	x		
818655-B3107	S		1115		7	3	5 day	x	x	x	x	x	x	x		
818655-B3108	S		1125		2	3	5 day	x	x	x	x	x	x	x		No Sims
818655-B3109	S		1140		7	4	5 day	x	x	x	x	x	x	x		
818655-B3110	S		1145		7	3	5 day	x	x	x	x	x	x	x		
818655-B3111	W		1315		10	3	5 day	x	x	x	x	x	x	x		No Sims
818655-B3112	S					3	5 day	x	x	x	x	x	x	x		Composite. Samples B3103, B3104, B3108 into one sample for analysis

SAMPLES COLLECTED BY: Wany-Lynn Jefferson
COURIER AND AIR BILL NUMBER: Courier
COOLER TEMPERATURE UPON RECEIPT:

RELINQUISHED BY	RECEIVED BY	DATE	TIME	SAMPLE'S CONDITION UPON RECEIPT
Wany-Lynn Jefferson	[signature]	1/12/02	3:30	

Distribution: White - Laboratory (To be returned with Analytical Report); Goldenrod - Project File; Manilla - Project Data Manager

Project Information Section For Project Personnel Only Do Not Submit to Laboratory

Sample Point Location	G	C	F	QC
① TAA636-Drum		X		
② TAA 651AE Drum				
③ Trip Blank				
④ TAA651A 18'' below Sump				
⑤ TAA651A 36'' below Sump				
⑥ TAA855 Drum				
⑦ TAA31A ~~36''~~ 18'' below Sump				
⑧ TAA31A ~~48''~~ 36'' below Sump				
⑨ Equipment Rinsate				
⑩ Composite Sample				

Comments

Sample Type: G - Grab, C - Composite, F - Field Sample, QC - Quality Control Sample he IT group

IT Corporation
2790 Mosside Blvd.
Monroeville, PA 15146-2792
(412)372-7701

CHAIN-OF-CUSTODY RECORD

PROJECT DATA MANAGER'S COPY

A 14696

02-K106

FORM 0019 REV. 9-99

'S LAB COORDINATOR: YNN JEFFERSON	LAB COORDINATOR'S PHONE: 949-660-7537	LAB COORDINATOR'S FAX: 949-475-5433	LABORATORY SERVICE ID: EMAX	LABORATORY CONTACT: YE MYINT	MAIL REPORT (COMPANY NAME): SHAW E+I
OJECT NAME: CAS EL TORO	PROJECT LOCATION: MCAS EL TORO	PROJECT NUMBER: 818655	LABORATORY PHONE: 310-618-8889	LABORATORY FAX:	RECIPIENT NAME: DWAYNE ISHIDA
OJECT CONTACT: HANANJAY RAWAL	PROJECT PHONE NUMBER: 949-660-7576	PROJECT FAX: 949-474-8309	LABORATORY ADDRESS: 1835 W 205th ST.		ADDRESS: 3347 MICHELSON DR. #200
OJECT ADDRESS: CAS EL TORO	CITY, STATE AND ZIP CODE: SANTA ANA, CA	CLIENT: EFA WEST	CITY, STATE AND ZIP CODE: TORRANCE, CA 90501		CITY, STATE AND ZIP CODE: IRVINE, CA 92612
OJECT MANAGER: HANANJAY RAWAL	PROJECT MANAGER'S PHONE: 949-660-7576	PROJECT MANAGER'S FAX: 949-474-8309			

Item	Sample Identifier	Matrix	Date	Time	Preserved	# of Cont.	QC Level	T.A.T.	Analyses: 8260B (VOCS)	SVOC + 9ms (8270)	8015 (GAS)	8015 (DIESEL)	8081 (PESTICIDES)	8082 (PCB)	6010 (METALS)		Comments
	818655-B3113	S	11/12/02	1230	4°C	7	3	5 DAY	x	x	x	x	x	x	x		
	818655-B3114	S	11/12/02	1240	4°C	7	3	5 day	x	x	x	x	x	x	x		
	818655-																

W.J. 11/12/02

SAMPLES COLLECTED BY: Way-Lynn Jeffer

COURIER AND AIR BILL NUMBER: Courier

COOLER TEMPERATURE UPON RECEIPT:

SAMPLE'S CONDITION UPON RECEIPT

RELINQUISHED BY	RECEIVED BY	DATE	TIME
Way-Lynn Jeff	Phil [illegible]	11-12-02	3:30

Distribution: White - Laboratory (To be returned with Analytical Report); Goldenrod - Project File; Manilla - Project Data Manager

Project Information Section
For Project Personnel Only
Do Not Submit to Laboratory

Sample Point Location	G	C	F	QC
① TAA 770	X			
~~18"~~ ~~36"~~ 18" below Sump				
② TAA 770	X			
~~48"~~ 36" below Sump				

Comments

Sample Type: G - Grab, C - Composite, F - Field Sample, QC - Quality Control Sample

METHOD 5030B/M8015
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client : SHAW E&I
Project : EL TORO, CTO 0024
Batch No. : 02K106

Matrix : WATER
instrument ID : GCT039

SAMPLE ID	EMAX SAMPLE ID	RESULTS (mg/L)	SURR (%)	DLF	MOIST	RL (mg/L)	MDL (mg/L)	Analysis DATETIME	Extraction DATETIME	LFID	CAL REF	PREP BATCH	Collection DATETIME	Received DATETIME
MBLK1W	VA39K16B	ND	98	1	NA	.1	.005	11/14/0207:12	11/14/0207:12	EK13031A	EK13025A	VA39K16	NA	11/14/02
LCS1W	VA39K16L	.594	128	1	NA	.1	.005	11/14/0206:04	11/14/0206:04	EK13029A	EK13025A	VA39K16	NA	11/14/02
LCD1W	VA39K16C	.557	123	1	NA	.1	.005	11/14/0206:38	11/14/0206:38	EK13030A	EK13025A	VA39K16	NA	11/14/02
818655-B3111	K106-09	ND	93	1	NA	.1	.005	11/14/0212:31	11/14/0212:31	EK13039A	EK13037A	VA39K16	11/12/02	11/12/02

RL : Reporting Limit

METHOD 5035/M8015
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client : SHAW E&I
Project : EL TORO, CTO 0024
Batch No. : 02K106

Matrix : SOIL
Instrument ID : GCT039

SAMPLE ID	EMAX SAMPLE ID	RESULTS (mg/kg)	SURR (%)	DLF	MOIST	RL (mg/kg)	MDL (mg/kg)	Analysis DATETIME	Extraction DATETIME	LFID	CAL REF	PREP BATCH	Collection DATETIME	Received DATETIME
MBLK1S	VM39K14B	ND	79	1	NA	10	.524	11/14/0200:25	11/14/0200:25	EK13019A	EK13013A	VM39K14	NA	11/14/02
LCS1S	VM39K14L	25.9	119	1	NA	10	.524	11/13/0223:17	11/13/0223:17	EK13017A	EK13013A	VM39K14	NA	11/13/02
LCD1S	VM39K14C	24	107	1	NA	10	.524	11/13/0223:51	11/13/0223:51	EK13018A	EK13013A	VM39K14	NA	11/13/02
818655-B3103(COMPOSITE)	K106-01	58	82	1	19.4	12	.65	11/14/0205:30	11/14/0205:30	EK13028A	EK13025A	VM39K14	11/12/02	11/12/02
818655-B3106	K106-04	ND	115	0.85	21.1	11	.56	11/14/0200:59	11/14/0200:59	EK13020A	EK13013A	VM39K14	11/12/02	11/12/02
818655-B3107	K106-05	ND	106	0.85	18.0	10	.54	11/14/0201:33	11/14/0201:33	EK13021A	EK13013A	VM39K14	11/12/02	11/12/02
818655-B3109	K106-07	ND	105	1.04	8.0	11	.59	11/14/0202:07	11/14/0202:07	EK13022A	EK13013A	VM39K14	11/12/02	11/12/02
818655-B3110	K106-08	ND	83	1.04	12.5	12	.62	11/14/0202:41	11/14/0202:41	EK13023A	EK13013A	VM39K14	11/12/02	11/12/02
818655-B3113	K106-10	ND	111	0.82	14.2	9.6	.5	11/14/0203:15	11/14/0203:15	EK13024A	EK13013A	VM39K14	11/12/02	11/12/02
818655-B3114	K106-11	ND	98	0.86	11.4	9.7	.51	11/14/0204:56	11/14/0204:56	EK13027A	EK13025A	VM39K14	11/12/02	11/12/02

RL : Reporting Limit
Metahnol Extraction: 11/13/02 17:30

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
TCH NO.: 02K106
THOD: METHOD 5030B/M8015

TRIX:	WATER			% MOISTURE:	NA
LUTION FACTOR:	1	1	1		
MPLE ID:	MBLK1W				
LAB SAMP ID:	VA39K16B	VA39K16L	VA39K16C		
B FILE ID:	EK13031A	EK13029A	EK13030A		
TE EXTRACTED:	11/14/0207:12	11/14/0206:04	11/14/0206:38	DATE COLLECTED:	NA
TE ANALYZED:	11/14/0207:12	11/14/0206:04	11/14/0206:38	DATE RECEIVED:	11/14/02
PREP. BATCH:	VA39K16	VA39K16	VA39K16		
CALIB. REF:	EK13025A	EK13025A	EK13025A		

CESSION:

RAMETER	BLNK RSLT (mg/L)	SPIKE AMT (mg/L)	BS RSLT (mg/L)	BS % REC	SPIKE AMT (mg/L)	BSD RSLT (mg/L)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
soline	ND	.55	.594	108	.55	.557	101	6	67-136	30

SURROGATE PARAMETER	SPIKE AMT (mg/L)	BS RSLT (mg/L)	BS % REC	SPIKE AMT (mg/L)	BSD RSLT (mg/L)	BSD % REC	QC LIMIT (%)
omofluorobenzene	.02	.0255	128	.02	.0246	123	63-154

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: METHOD 5035/M8015

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1S				
LAB SAMP ID:	VM39K14B	VM39K14L	VM39K14C		
LAB FILE ID:	EK13019A	EK13017A	EK13018A		
DATE EXTRACTED:	11/14/0200:25	11/13/0223:17	11/13/0223:51	DATE COLLECTED:	NA
DATE ANALYZED:	11/14/0200:25	11/13/0223:17	11/13/0223:51	DATE RECEIVED:	11/13/02
PREP. BATCH:	VM39K14	VM39K14	VM39K14		
CALIB. REF:	EK13013A	EK13013A	EK13013A		

ACCESSION:

PARAMETER	BLNK RSLT (mg/kg)	SPIKE AMT (mg/kg)	BS RSLT (mg/kg)	BS % REC	SPIKE AMT (mg/kg)	BSD RSLT (mg/kg)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Gasoline	ND	27.5	25.9	94	27.5	24	87	7	57-146	50

SURROGATE PARAMETER	SPIKE AMT (mg/kg)	BS RSLT (mg/kg)	BS % REC	SPIKE AMT (mg/kg)	BSD RSLT (mg/kg)	BSD % REC	QC LIMIT (%)
Bromofluorobenzene	1	1.19	119	1	1.07	107	63-154

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : SHAW E&I
Project : EL TORO, CTO 0024
Batch No. : 02K106

Matrix : WATER
Instrument ID : GCT050

SAMPLE ID	EMAX SAMPLE ID	RESULTS (mg/L)	SUR1 (%)	SUR2 (%)	DLF	MOIST	RL (mg/L)	MDL (mg/L)	Analysis DATETIME	Extraction DATETIME	LFID	CAL REF	PREP BATCH	Collection DATETIME	Received DATETIME
MBLK1W	DSK018WB	ND	75	90	1	NA	.1	.1	11/15/0210:51	11/14/0212:30	TK13057A	TK13050A	DSK018W	NA	11/14/02
LCS1W	DSK018WL	4.63	69	101	1	NA	.1	.1	11/15/0211:40	11/14/0212:30	TK13058A	TK13050A	DSK018W	NA	11/14/02
LCD1W	DSK018WC	5.1	90	99	1	NA	.1	.1	11/15/0212:28	11/14/0212:30	TK13059A	TK13050A	DSK018W	NA	11/14/02
818655-B3111	K106-09	ND	81	97	.94	NA	.094	.094	11/15/0213:17	11/14/0212:30	TK13060A	TK13050A	DSK018W	11/12/02	11/12/02

RL : Reporting Limit
SURR1 : Bromobenzene
SURR2 : Hexacosane
Parameter H-C Range
Diesel C10-C38

CA LUFT/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : SHAW E&I
Project : EL TORO, CTO 0024
Batch No. : 02K106

Matrix : SOIL
Instrument ID : GCT050

SAMPLE ID	EMAX SAMPLE ID	RESULTS (mg/kg)	SUR1 (%)	SUR2 (%)	DLF	MOIST	RL (mg/kg)	MDL (mg/kg)	Analysis DATETIME	Extraction DATETIME	LFID	CAL REF	PREP BATCH	Collection DATETIME	Receiv DATETI
MBLK1S	DSK019SB	ND	91	98	1	NA	10	4	11/15/0201:06	11/14/0212:15	TK13045A	TK13037A	DSK019S	NA	11/14/
LCS1S	DSK019SL	563	101	102	1	NA	10	4	11/15/0201:54	11/14/0212:15	TK13046A	TK13037A	DSK019S	NA	11/14/
818655-B3103(COMPOSITE)	K106-01T	7600	DO	DO	10	19.4	120	50	11/15/0202:43	11/14/0212:15	TK13047A	TK13037A	DSK019S	11/12/02	11/12/
818655-B3106	K106-04	ND	87	95	1	21.1	13	5.1	11/15/0203:32	11/14/0212:15	TK13048A	TK13037A	DSK019S	11/12/02	11/12/
818655-B3107	K106-05	ND	84	90	1	18.0	12	4.9	11/15/0204:21	11/14/0212:15	TK13049A	TK13037A	DSK019S	11/12/02	11/12/
818655-B3109	K106-07	ND	85	88	1	8.0	11	4.3	11/15/0205:58	11/14/0212:15	TK13051A	TK13050A	DSK019S	11/12/02	11/12/
818655-B3110	K106-08	93	84	95	1	12.5	11	4.6	11/15/0206:47	11/14/0212:15	TK13052A	TK13050A	DSK019S	11/12/02	11/12/
818655-B3113	K106-10	ND	86	92	1	14.2	12	4.7	11/15/0207:36	11/14/0212:15	TK13053A	TK13050A	DSK019S	11/12/02	11/12/
818655-B3114	K106-11	ND	82	86	1	11.4	11	4.5	11/15/0208:24	11/14/0212:15	TK13054A	TK13050A	DSK019S	11/12/02	11/12/
818655-B3114MS	K106-11M	571	95	91	1	11.4	11.3	4.51	11/15/0209:13	11/14/0212:15	TK13055A	TK13050A	DSK019S	11/12/02	11/12/
818655-B3114MSD	K106-11S	602	99	95	1	11.4	11.3	4.51	11/15/0210:02	11/14/0212:15	TK13056A	TK13050A	DSK019S	11/12/02	11/12/

RL : Reporting Limit
SURR1 : Bromobenzene
SURR2 : Hexacosane
Parameter H-C Range
Diesel C10-C38

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
ATCH NO.: 02K106
ETHOD: METHOD 3520C/M8015

ATRIX:	WATER			% MOISTURE:	NA
ILUTION FACTOR:	1	1	1		
AMPLE ID:	MBLK1W				
LAB SAMP ID:	DSK018WB	DSK018WL	DSK018WC		
AB FILE ID:	TK13057A	TK13058A	TK13059A		
ATE EXTRACTED:	11/14/0212:30	11/14/0212:30	11/14/0212:30	DATE COLLECTED:	NA
ATE ANALYZED:	11/15/0210:51	11/15/0211:40	11/15/0212:28	DATE RECEIVED:	11/14/02
PREP. BATCH:	DSK018W	DSK018W	DSK018W		
CALIB. REF:	TK13050A	TK13050A	TK13050A		

CCESSION:

ARAMETER	BLNK RSLT (mg/L)	SPIKE AMT (mg/L)	BS RSLT (mg/L)	BS % REC	SPIKE AMT (mg/L)	BSD RSLT (mg/L)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
iesel	ND	5	4.63	93	5	5.1	102	10	65-135	30

SURROGATE PARAMETER	SPIKE AMT (mg/L)	BS RSLT (mg/L)	BS % REC	SPIKE AMT (mg/L)	BSD RSLT (mg/L)	BSD % REC	QC LIMIT (%)
romobenzene	1	.691	69	1	.901	90	50-150
exacosane	.25	.253	101	.25	.246	99	40-160

EMAX QUALITY CONTROL DATA
LCS ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: CA LUFT/M8015

MATRIX:	SOIL		% MOISTURE:	NA
DILUTION FACTOR:	1	1		
SAMPLE ID:	MBLK1S			
LAB SAMP ID:	DSK019SB	DSK019SL		
LAB FILE ID:	TK13045A	TK13046A		
DATE EXTRACTED:	11/14/0212:15	11/14/0212:15	DATE COLLECTED:	NA
DATE ANALYZED:	11/15/0201:06	11/15/0201:54	DATE RECEIVED:	11/14/02
PREP. BATCH:	DSK019S	DSK019S		
CALIB. REF:	TK13037A	TK13037A		

ACCESSION:

PARAMETER	BLNK RSLT (mg/kg)	SPIKE AMT (mg/kg)	BS RSLT (mg/kg)	BS % REC	QC LIMIT (%)
Diesel	ND	500	563	113	65-135

SURROGATE PARAMETER	SPIKE AMT (mg/kg)	BS RSLT (mg/kg)	BS % REC	QC LIMIT (%)
Bromobenzene	100	101	101	50-150
Hexacosane	25	25.5	102	30-160

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT:	SHAW E&I
PROJECT:	EL TORO, CTO 0024
BATCH NO.:	02K106
METHOD:	CA LUFT/M8015

MATRIX:	SOIL			% MOISTURE:	11.4
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	818655-B3114				
LAB SAMP ID:	K106-11	K106-11M	K106-11S		
LAB FILE ID:	TK13054A	TK13055A	TK13056A		
DATE EXTRACTED:	11/14/0212:15	11/14/0212:15	11/14/0212:15	DATE COLLECTED:	11/12/02
DATE ANALYZED:	11/15/0208:24	11/15/0209:13	11/15/0210:02	DATE RECEIVED:	11/12/02
PREP. BATCH:	DSK019S	DSK019S	DSK019S		
CALIB. REF:	TK13050A	TK13050A	TK13050A		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SPIKE AMT (mg/kg)	MS RSLT (mg/kg)	MS % REC	SPIKE AMT (mg/kg)	MSD RSLT (mg/kg)	MSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
Diesel	ND	563	571	102	563	602	108	5	65-135	50

SURROGATE PARAMETER	SPIKE AMT (mg/kg)	MS RSLT (mg/kg)	MS % REC	SPIKE AMT (mg/kg)	MSD RSLT (mg/kg)	MSD % REC	QC LIMIT (%)
Bromobenzene	113	108	95	113	111	99	45-165
Hexacosane	28.2	25.8	91	28.2	26.9	95	27-176

SW3550B/8081A
PESTICIDES

Client : SHAW E&I	Date Collected: 11/12/02
Project : EL TORO, CTO 0024	Date Received: 11/12/02
Batch No. : 02K106	Date Extracted: 11/14/02 16:00
Sample ID: 818655-B3109	Date Analyzed: 11/16/02 15:42
Lab Samp ID: K106-07	Dilution Factor: 1
Lab File ID: SK15061A	Matrix : SOIL
Ext Btch ID: CPK017S	% Moisture : 8.0
Calib. Ref.: SK15055A	Instrument ID : GCT008

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
ALPHA-BHC	.00045J | (ND)	.0022	.00022 | .00022
GAMMA-BHC (LINDANE)	(ND) | ND	.0022	.00022 | .00022
BETA-BHC	(ND) | ND	.0022	.00022 | .00022
HEPTACHLOR	(ND) | ND	.0022	.0011 | .0011
DELTA-BHC	(ND) | ND	.0022	.00022 | .00022
ALDRIN	(ND) | ND	.0022	.00054 | .00054
HEPTACHLOR EPOXIDE	(ND) | ND	.0022	.00022 | .00022
GAMMA-CHLORDANE	(ND) | ND	.0022	.00022 | .00022
ALPHA-CHLORDANE	(ND) | ND	.0022	.00022 | .00022
ENDOSULFAN I	(ND) | ND	.0043	.0011 | .0011
4,4'-DDE	(ND) | ND	.0043	.0011 | .0011
DIELDRIN	(ND) | ND	.0043	.00054 | .00054
ENDRIN	(ND) | ND	.0033	.0011 | .0011
4,4'-DDD	(ND) | ND	.0043	.0011 | .0011
ENDOSULFAN II	(ND) | ND	.0043	.00054 | .00054
4,4'-DDT	(ND) | ND	.0043	.0011 | .0011
ENDRIN ALDEHYDE	(ND) | ND	.0043	.00054 | .00054
ENDOSULFAN SULFATE	(ND) | ND	.0043	.00054 | .00054
ENDRIN KETONE	(ND) | ND	.0033	.0011 | .0011
METHOXYCHLOR	(ND) | ND	.022	.0043 | .0043
TOXAPHENE	(ND) | ND	.11	.0087 | .0087

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(91) | 84	35-135
DECACHLOROBIPHENYL	73 | (76)	25-143

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
( ) included the reported column

SW3550B/8081A
PESTICIDES

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Client	: SHAW E&I	Date Collected:	11/12/02
roject	: EL TORO, CTO 0024	Date Received:	11/12/02
atch No.	: 02K106	Date Extracted:	11/14/02 16:00
Sample ID:	818655-B3110	Date Analyzed:	11/16/02 16:08
ab Samp ID:	K106-08	Dilution Factor:	1
ab File ID:	SK15062A	Matrix	: SOIL
xt Btch ID:	CPK017S	% Moisture	: 12.5
Calib. Ref.:	SK15055A	Instrument ID	: GCT008

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PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
LPHA-BHC	(.0011J)|.00034J	.0023	.00023|.00023
AMMA-BHC (LINDANE)	(ND)|ND	.0023	.00023|.00023
BETA-BHC	(ND)|ND	.0023	.00023|.00023
HEPTACHLOR	(ND)|ND	.0023	.0011|.0011
ELTA-BHC	(ND)|ND	.0023	.00023|.00023
LDRIN	(ND)|ND	.0023	.00057|.00057
HEPTACHLOR EPOXIDE	(ND)|ND	.0023	.00023|.00023
GAMMA-CHLORDANE	(ND)|ND	.0023	.00023|.00023
LPHA-CHLORDANE	(ND)|ND	.0023	.00023|.00023
NDOSULFAN I	(ND)|ND	.0046	.0011|.0011
4,4'-DDE	(ND)|ND	.0046	.0011|.0011
DIELDRIN	(ND)|ND	.0046	.00057|.00057
NDRIN	(ND)|ND	.0034	.0011|.0011
,4'-DDD	(ND)|ND	.0046	.0011|.0011
ENDOSULFAN II	(ND)|ND	.0046	.00057|.00057
4,4'-DDT	(ND)|ND	.0046	.0011|.0011
NDRIN ALDEHYDE	(ND)|ND	.0046	.00057|.00057
NDOSULFAN SULFATE	(ND)|ND	.0046	.00057|.00057
ENDRIN KETONE	(ND)|ND	.0034	.0011|.0011
METHOXYCHLOR	(ND)|ND	.023	.0046|.0046
OXAPHENE	(ND)|ND	.11	.0091|.0091

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
ETRACHLORO-M-XYLENE	76|(78)	35-135
ECACHLOROBIPHENYL	75|(76)	25-143

RL : Reporting limit
eft of | is related to first column ; Right of | related to second column
) included the reported column

SW3520C/8081A
PESTICIDES

Client	: SHAW E&I	Date Collected:	NA
Project	: EL TORO, CTO 0024	Date Received:	11/14/02
Batch No.	: 02K106	Date Extracted:	11/14/02 13:30
Sample ID:	MBLK1W	Date Analyzed:	11/16/02 00:08
Lab Samp ID:	CPK016WB	Dilution Factor:	1
Lab File ID:	SK15024A	Matrix	: WATER
Ext Btch ID:	CPK016W	% Moisture	: NA
Calib. Ref.:	SK15003A	Instrument ID	: GCT008

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ALPHA-BHC	(ND)|ND	.1	.01|.01
GAMMA-BHC (LINDANE)	(ND)|ND	.1	.01|.01
BETA-BHC	(ND)|ND	.1	.01|.01
HEPTACHLOR	(ND)|ND	.1	.01|.01
DELTA-BHC	(ND)|ND	.1	.01|.01
ALDRIN	(ND)|ND	.1	.01|.01
HEPTACHLOR EPOXIDE	(ND)|ND	.1	.01|.01
GAMMA-CHLORDANE	(ND)|ND	.1	.01|.01
ALPHA-CHLORDANE	(ND)|ND	.1	.01|.01
ENDOSULFAN I	(ND)|ND	.1	.03|.03
4,4'-DDE	(ND)|ND	.2	.03|.03
DIELDRIN	(ND)|ND	.2	.1|.1
ENDRIN	(ND)|ND	.1	.01|.01
4,4'-DDD	(ND)|ND	.2	.03|.03
ENDOSULFAN II	(ND)|ND	.2	.01|.01
4,4'-DDT	(ND)|ND	.2	.02|.02
ENDRIN ALDEHYDE	(ND)|ND	.2	.01|.01
ENDOSULFAN SULFATE	(ND)|ND	.2	.01|.01
ENDRIN KETONE	(ND)|ND	.1	.01|.01
METHOXYCHLOR	(ND)|ND	1	.1|.1
TOXAPHENE	(ND)|ND	3	1.2|1.2

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(87)|84	45-125
DECACHLOROBIPHENYL	(105)|102	34-133

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
( ) included the reported column

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO..: 02K106
METHOD: SW3520C/8081A

MATRIX:	WATER			% MOISTURE:	NA
DILUTION FACTOR:	1	i	1		
SAMPLE ID:	MBLK1W				
LAB SAMP ID:	CPK016WB	CPK016WL	CPK016WC		
LAB FILE ID:	SK15024A	SK15025A	SK15026A		
DATE EXTRACTED:	11/14/0213:30	11/14/0213:30	11/14/0213:30	DATE COLLECTED:	NA
DATE ANALYZED:	11/16/0200:08	11/16/0200:33	11/16/0200:58	DATE RECEIVED:	11/14/02
PREP. BATCH:	CPK016W	CPK016W	CPK016W		
CALIB. REF:	SK15003A	SK15003A	SK15003A		

ACCESSION:

PARAMETER	BLNK RSLT (ug/L)	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
alpha-BHC	(ND) ND	.2	(.162) .149	(81) 74*	.2	(.165) .151	(82) 75	(2) 1	75-125	30
gamma-BHC (Lindane)	(ND) ND	.2	(.171) .159	(86) 79	.2	(.173) .162	(86) 81	(1) 2	73-125	30
beta-BHC	(ND) ND	.2	.183 (.184)	92 (92)	.2	(.187) .186	(94) 93	(2) 1	51-125	30
Heptachlor	(ND) ND	.2	.183 (.184)	92 (92)	.2	.185 (.19)	92 (95)	1 (3)	45-128	30
delta-BHC	(ND) ND	.2	(.19) .152	(95) 76	.2	(.194) .149	(97) 74*	(2) 2	75-126	30
Aldrin	(ND) ND	.2	(.187) .171	(94) 86	.2	(.191) .174	(96) 87	(2) 2	47-125	30
Heptachlor Epoxide	(ND) ND	.2	(.192) .173	(96) 86	.2	(.194) .175	(97) 88	(1) 1	53-134	30
gamma-Chlordane	(ND) ND	.2	(.19) .181	(95) 90	.2	(.193) .183	(96) 92	(2) 1	41-125	30
alpha-Chlordane	(ND) ND	.2	(.197) .181	(98) 90	.2	(.2) .186	(100) 93	(2) 3	41-125	30
Endosulfan I	(ND) ND	.2	(.255) .187	(127) 94	.2	(.268) .188	(134) 94	(5) 1	49-143	30
4,4'-DDE	(ND) ND	.4	.373 (.387)	93 (97)	.4	.37 (.394)	92 (98)	1 (2)	45-139	30
Dieldrin	(ND) ND	.4	(.369) .346	(92) 86	.4	(.375) .352	(94) 88	(2) 2	42-132	30
Endrin	(ND) ND	.4	(.331) .308	(83) 77	.4	(.337) .311	(84) 78	(2) 1	43-134	30
4,4'-DDD	(ND) ND	.4	(.42) .383	(105) 96	.4	(.428) .392	(107) 98	(2) 2	48-136	30
Endosulfan II	(ND) ND	.4	(.427) .401	(107) 100	.4	(.434) .407	(108) 102	(2) 1	75-159	30
4,4'-DDT	(ND) ND	.4	(.433) .365	(108) 91	.4	(.439) .373	(110) 93	(1) 2	34-143	30
Endrin Aldehyde	(ND) ND	.4	(.459) .416	(115) 104	.4	(.468) .422	(117) 105	(2) 1	75-150	30
Endosulfan Sulfate	(ND) ND	.4	(.428) .385	(107) 96	.4	(.431) .384	(108) 96	(1) 0	46-141	30
Endrin Ketone	(ND) ND	.4	(.473) .434	(118) 108	.4	(.481) .44	(120) 110	(2) 1	75-150	30
Methoxychlor	(ND) ND	2	(2.22) 2.01	(111) 100	2	(2.25) 2.03	(112) 102	(1) 1	73-142	30

SURROGATE PARAMETER	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	QC LIMIT (%)
Tetrachloro-m-xylene	.4	(.311) .296	(77) 74	.4	(.314) .299	(78) 74	45-125
Decachlorobiphenyl	.8	(.736) .658	(92) 82	.8	(.743) .664	(93) 83	34-133

SW3550B/8081A
PESTICIDES

Client	: SHAW E&I	Date Collected	: NA
Project	: EL TORO, CTO 0024	Date Received	: 11/14/02
Batch No.	: 02K106	Date Extracted	: 11/14/02 16:00
Sample ID	: MBLK1S	Date Analyzed	: 11/16/02 06:52
Lab Samp ID	: CPK017SB	Dilution Factor	: 1
Lab File ID	: SK15040A	Matrix	: SOIL
Ext Btch ID	: CPK017S	% Moisture	: NA
Calib. Ref.	: SK15029A	Instrument ID	: GCT008

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
ALPHA-BHC	(ND) | ND	.002	.0002 | .0002
GAMMA-BHC (LINDANE)	(ND) | ND	.002	.0002 | .0002
BETA-BHC	(ND) | ND	.002	.0002 | .0002
HEPTACHLOR	(ND) | ND	.002	.001 | .001
DELTA-BHC	(ND) | ND	.002	.0002 | .0002
ALDRIN	(ND) | ND	.002	.0005 | .0005
HEPTACHLOR EPOXIDE	(ND) | ND	.002	.0002 | .0002
GAMMA-CHLORDANE	(ND) | ND	.002	.0002 | .0002
ALPHA-CHLORDANE	(ND) | ND	.002	.0002 | .0002
ENDOSULFAN I	(ND) | ND	.004	.001 | .001
4,4'-DDE	(ND) | ND	.004	.001 | .001
DIELDRIN	(ND) | ND	.004	.0005 | .0005
ENDRIN	(ND) | ND	.003	.001 | .001
4,4'-DDD	(ND) | ND	.004	.001 | .001
ENDOSULFAN II	(ND) | ND	.004	.0005 | .0005
4,4'-DDT	(ND) | ND	.004	.001 | .001
ENDRIN ALDEHYDE	(ND) | ND	.004	.0005 | .0005
ENDOSULFAN SULFATE	(ND) | ND	.004	.0005 | .0005
ENDRIN KETONE	(ND) | ND	.003	.001 | .001
METHOXYCHLOR	(ND) | ND	.02	.004 | .004
TOXAPHENE	(ND) | ND	.1	.008 | .008

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(77) | 77	35-135
DECACHLOROBIPHENYL	(95) | 93	25-143

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
( ) included the reported column

EMAX QUALITY CONTROL DATA
LCS ANALYSIS

CLIENT:	SHAW E&I
PROJECT:	EL TORO, CTO 0024
BATCH NO.:	02K106
METHOD:	SW3550B/8081A

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MATRIX:	SOIL		% MOISTURE:	NA
DILUTION FACTOR:	1	1		
SAMPLE ID:	MBLK1S			
LAB SAMP ID:	CPK017SB	CPK017SL		
LAB FILE ID:	SK15040A	SK15041A		
DATE EXTRACTED:	11/14/0216:00	11/14/0216:00	DATE COLLECTED:	NA
DATE ANALYZED:	11/16/0206:52	11/16/0207:17	DATE RECEIVED:	11/14/02
PREP. BATCH:	CPK017S	CPK017S		
CALIB. REF:	SK15029A	SK15029A		

ACCESSION:

PARAMETER	BLNK RSLT (mg/kg)	SPIKE AMT (mg/kg)	BS RSLT (mg/kg)	BS % REC	QC LIMIT (%)
alpha-BHC	(ND)|ND	.00667	(.00451)|.00449	(68)|67	65-135
gamma-BHC (Lindane)	(ND)|ND	.00667	(.00501)|.00476	(75)|71	63-130
beta-BHC	(ND)|ND	.00667	(.00555)|.00533	(83)|80	41-133
Heptachlor	(ND)|ND	.00667	(.00517)|.00495	(78)|74	35-138
delta-BHC	(ND)|ND	.00667	(.00557)|.00512	(84)|77	65-136
Aldrin	(ND)|ND	.00667	(.00554)|.00516	(83)|77	37-126
Heptachlor Epoxide	(ND)|ND	.00667	(.00572)|.00536	(86)|80	43-144
gamma-Chlordane	(ND)|ND	.00667	.00567|(.0057)	85|(85)	31-133
alpha-Chlordane	(ND)|ND	.00667	(.00588)|.00571	(88)|86	31-135
Endosulfan I	(ND)|ND	.00667	(.0068)|.00583	(102)|87	39-153
4,4'-DDE	(ND)|ND	.0133	.0123|(.0124)	92|(93)	35-149
Dieldrin	(ND)|ND	.0133	(.011)|.0109	(83)|82	32-142
Endrin	(ND)|ND	.0133	(.00918)|.00907	(69)|68	33-144
4,4'-DDD	(ND)|ND	.0133	(.0129)|.0124	(97)|93	38-146
Endosulfan II	(ND)|ND	.0133	(.0131)|.0127	(98)|95	65-169
4,4'-DDT	(ND)|ND	.0133	(.0127)|.0111	(95)|83	25-153
Endrin Aldehyde	(ND)|ND	.0133	(.0145)|.0136	(109)|102	65-160
Endosulfan Sulfate	(ND)|ND	.0133	(.0133)|.0125	(100)|94	36-151
Endrin Ketone	(ND)|ND	.0133	(.0145)|.0139	(109)|104	65-160
Methoxychlor	(ND)|ND	.0667	(.0671)|.0619	(101)|93	63-152

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SURROGATE PARAMETER	SPIKE AMT (mg/kg)	BS RSLT (mg/kg)	BS % REC	QC LIMIT (%)
Tetrachloro-m-xylene	.0133	(.00937)|.00923	(70)|69	35-135
Decachlorobiphenyl	.0266	(.024)|.0221	(90)|83	25-143

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: SW3550B/8081A

MATRIX:	SOIL			% MOISTURE:	11.4
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	818655-B3114				
LAB SAMP ID:	K106-11	K106-11M	K106-11S		
LAB FILE ID:	SK15045A	SK15046A	SK15047A		
DATE EXTRACTED:	11/14/0216:00	11/14/0216:00	11/14/0216:00	DATE COLLECTED:	11/12/02
DATE ANALYZED:	11/16/0208:58	11/16/0209:23	11/16/0209:48	DATE RECEIVED:	11/12/02
PREP. BATCH:	CPK017S	CPK017S	CPK017S		
CALIB. REF:	SK15029A	SK15029A	SK15029A		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SPIKE AMT (mg/kg)	MS RSLT (mg/kg)	MS % REC	SPIKE AMT (mg/kg)	MSD RSLT (mg/kg)	MSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
alpha-BHC	(ND) ND	.00753	(.00337) .00328	(45*) 44*	.00753	.00592 (.00624)	79 (83)	55* (62*)	65-135	50
gamma-BHC (Lindane)	(ND) ND	.00753	.00386 (.00396)	51* (53*)	.00753	.00573 (.00624)	76 (83)	39 (45)	63-130	50
beta-BHC	(ND) .0017J	.00753	.00707 (.00782)	94 (81)	.00753	.00627 (.00665)	83 (66)	12 (16)	41-133	50
Heptachlor	.0016J (ND)	.00753	.0057 (.00721)	54 (96)	.00753	.00601 (.007)	59 (93)	5 (3)	35-138	50
delta-BHC	(ND) .00034J	.00753	.00469 (.00595)	62* (75)	.00753	(.00662) .00586	(88) 73	(34) 2	65-136	50
Aldrin	(ND) ND	.00753	.00355 (.00689)	47 (92)	.00753	.00673 (.00714)	89 (95)	62* (4)	37-126	50
Heptachlor Epoxide	(ND) ND	.00753	.00354 (.00493)	47 (65)	.00753	(.0064) .00637	(85) 85	58* (25)	43-144	50
gamma-Chlordane	(ND) ND	.00753	.00359 (.00454)	48 (60)	.00753	.00635 (.00647)	84 (86)	56* (35)	31-133	50
alpha-Chlordane	(ND) ND	.00753	.00357 (.00362)	47 (48)	.00753	(.00651) .00649	(86) 86	(58*) 57*	31-135	50
Endosulfan I	(ND) ND	.00753	.00316J (.00366J)	42 (49)	.00753	.00617 (.00671)	82 (89)	65* (59*)	39-153	50
4,4'-DDE	(ND) ND	.015	(.00868) .00769	(58) 51	.015	(.0148) .014	(98) 93	(52*) 58*	35-149	50
Dieldrin	(ND) ND	.015	.00596 (.00706)	40 (47)	.015	.0119 (.0123)	79 (82)	67* (54*)	32-142	50
Endrin	(ND) ND	.015	(.00629) .00606	(42) 40	.015	.0103 (.0107)	68 (71)	(48) 55*	33-144	50
4,4'-DDD	(ND) ND	.015	(.0107) .00743	(71) 49	.015	.0138 (.014)	92 (93)	(25) 61*	38-146	50
Endosulfan II	(ND) ND	.015	(.00932) .00774	(62*) 51*	.015	.0135 (.0138)	90 (92)	(37) 56*	65-169	50
4,4'-DDT	(ND) ND	.015	.00939 (.0133)	62 (88)	.015	(.0138) .0127	(92) 84	(38) 5	25-153	50
Endrin Aldehyde	(ND) ND	.015	.00903 (.0137)	60* (91)	.015	(.0148) .0148	(98) 98	(48) 8	65-160	50
Endosulfan Sulfate	(ND) ND	.015	(.0168) .00959	(112) 64	.015	(.0149) .0145	(99) 96	(12) 41	36-151	50
Endrin Ketone	(ND) ND	.015	(.0118) .008	(78) 53*	.015	(.015) .015	(100) 100	(24) 61*	65-160	50
Methoxychlor	(ND) ND	.0752	(.0431) .0417	(57*) 55*	.0752	(.074) .0714	(98) 95	(53*) 53*	63-152	50

SURROGATE PARAMETER	SPIKE AMT (mg/kg)	MS RSLT (mg/kg)	MS % REC	SPIKE AMT (mg/kg)	MSD RSLT (mg/kg)	MSD % REC	QC LIMIT (%)
Tetrachloro-m-xylene	.015	.00991 (.0103)	66 (68)	.015	.0117 (.0119)	78 (79)	35-135
Decachlorobiphenyl	.030	(.0195) .0195	(65) 65	.030	(.0259) .0244	(86) 81	25-143

SW 5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: SHAW E&I	Date Collected:	11/12/02
Project	: EL TORO, CTO 0024	Date Received:	11/12/02
Batch No.	: 02K106	Date Extracted:	11/16/02 20:03
Sample ID:	818655-B3105	Date Analyzed:	11/16/02 20:03
Lab Samp ID:	K106-03	Dilution Factor:	1
Lab File ID:	RKW353	Matrix	: WATER
Ext Btch ID:	V006K38	% Moisture	: NA
Calib. Ref.:	RKW094	Instrument ID	: T-006

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
1,1,1-TRICHLOROETHANE	ND	5	2
1,1,2,2-TETRACHLOROETHANE	ND	5	2
1,1,2-TRICHLOROETHANE	ND	5	2
1,1-DICHLOROETHANE	ND	5	2
1,1-DICHLOROETHENE	ND	5	2
1,2-DICHLOROETHANE	ND	5	2
1,2-DICHLOROPROPANE	ND	5	2
2-BUTANONE (MEK)	ND	50	5
2-HEXANONE	ND	50	5
2-CHLOROETHYLVINYLETHER	ND	50	2
4-METHYL-2-PENTANONE (MIBK)	ND	50	5
ACETONE	ND	50	5
BENZENE	ND	5	2
BROMODICHLOROMETHANE	ND	5	2
BROMOFORM	ND	5	2
BROMOMETHANE	ND	5	3
CARBON DISULFIDE	ND	5	2
CARBON TETRACHLORIDE	ND	5	2
CHLOROBENZENE	ND	5	2
CHLOROETHANE	ND	5	2
CHLOROFORM	ND	5	2
CHLOROMETHANE	ND	5	2.5
CIS-1,2-DICHLOROETHENE	ND	5	2
CIS-1,3-DICHLOROPROPENE	ND	5	2
DIBROMOCHLOROMETHANE	ND	5	2
ETHYLBENZENE	ND	5	2
XYLENE,TOTAL	ND	5	3
METHYLENE CHLORIDE	ND	5	2
MTBE	ND	10	2
STYRENE	ND	5	2
TOLUENE	ND	5	2
TRANS-1,2-DICHLOROETHENE	ND	5	2
TRANS-1,3-DICHLOROPROPENE	ND	5	2
TRICHLOROETHENE	ND	5	2
TETRACHLOROETHENE	ND	5	2
VINYL ACETATE	ND	50	2
VINYL CHLORIDE	ND	5	2

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	113	86-118
BROMOFLUOROBENZENE	93	86-115
TOLUENE-D8	102	88-110

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: SW 5035/8260B

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1S				
LAB SAMP ID:	V006K40B	V006K40L	V006K40C		
LAB FILE ID:	RKW371	RKW369	RKW370		
DATE EXTRACTED:	11/18/0214:20	11/18/0213:08	11/18/0213:44	DATE COLLECTED:	NA
DATE ANALYZED:	11/18/0214:20	11/18/0213:08	11/18/0213:44	DATE RECEIVED:	11/18/02
PREP. BATCH:	V006K40	V006K40	V006K40		
CALIB. REF:	RKW094	RKW094	RKW094		

ACCESSION:

PARAMETER	BLNK RSLT (ug/kg)	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
1,1-Dichloroethene	ND	20	23.2	116	20	22.1	110	5	65-135	30
Benzene	ND	20	22.5	113	20	20.9	104	8	65-135	30
Chlorobenzene	ND	20	23.8	119	20	22.4	112	6	65-135	30
Toluene	ND	20	22.6	113	20	22.2	111	2	64-135	30
Trichloroethene	ND	20	23.5	118	20	21.7	109	8	61-135	30

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	QC LIMIT (%)
1,2-Dichloroethane-d4	50	57.9	116	50	61	122	70-130
Bromofluorobenzene	50	45.7	91	50	46.6	93	70-130
Toluene-d8	50	46.5	93	50	46.3	93	70-130

SW 5035/8260B
VOLATILE ORGANICS BY GC/MS

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Client	: SHAW E&I	Date Collected:	NA
roject	: EL TORO, CTO 0024	Date Received:	11/18/02
atch No.	: 02K106	Date Extracted:	11/18/02 14:56
ample ID:	MBLK2S	Date Analyzed:	11/18/02 14:56
Lab Samp ID:	VPK009SB	Dilution Factor:	1.0
ab File ID:	RKW372	Matrix	: SOIL
xt Btch ID:	V006K40	% Moisture	: NA
alib. Ref.:	RKW094	Instrument ID	: T-006

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ARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
1,1,1-TRICHLOROETHANE	ND	5	2
,1,2,2-TETRACHLOROETHANE	ND	5	2
,1,2-TRICHLOROETHANE	ND	5	2
,1-DICHLOROETHANE	ND	5	2
1,1-DICHLOROETHENE	ND	5	2
,2-DICHLOROETHANE	ND	5	2
,2-DICHLOROPROPANE	ND	5	2
-BUTANONE (MEK)	ND	50	5
2-HEXANONE	ND	50	5
2-CHLOROETHYLVINYLETHER	ND	50	2
-METHYL-2-PENTANONE (MIBK)	ND	50	5
CETONE	ND	50	5
BENZENE	ND	5	2
BROMODICHLOROMETHANE	ND	5	2
ROMOFORM	ND	5	2
ROMOMETHANE	ND	5	3
CARBON DISULFIDE	ND	5	2
CARBON TETRACHLORIDE	ND	5	2
HLOROBENZENE	ND	5	2
HLOROETHANE	ND	5	3
HLOROFORM	ND	5	2
CHLOROMETHANE	ND	5	5
IS-1,2-DICHLOROETHENE	ND	5	2
IS-1,3-DICHLOROPROPENE	ND	5	2
IBROMOCHLOROMETHANE	ND	5	2
ETHYLBENZENE	ND	5	2
XYLENE,TOTAL	ND	5	3
ETHYLENE CHLORIDE	ND	5	2
TBE	ND	10	2
STYRENE	ND	5	2
TOLUENE	ND	5	2
ANS-1,2-DICHLOROETHENE	ND	5	2
RANS-1,3-DICHLOROPROPENE	ND	5	2
TRICHLOROETHENE	ND	5	2
TETRACHLOROETHENE	ND	5	2
NYL ACETATE	ND	50	2
NYL CHLORIDE	ND	5	2

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-DICHLOROETHANE-D4	115	70-130
ROMOFLUOROBENZENE	92	70-130
TOLUENE-D8	98	70-130

eservation Date: 11/13/02 16:25

SW 5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: SHAW E&I	Date Collected:	NA
Project	: EL TORO, CTO 0024	Date Received:	11/19/02
Batch No.	: 02K106	Date Extracted:	11/19/02 04:08
Sample ID:	MBLK3S	Date Analyzed:	11/19/02 04:08
Lab Samp ID:	V006K42B	Dilution Factor:	1
Lab File ID:	RKW391	Matrix	: SOIL
Ext Btch ID:	V006K42	% Moisture	: NA
Calib. Ref.:	RKW094	Instrument ID	: T-006

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
1,1,1-TRICHLOROETHANE	ND	5	2
1,1,2,2-TETRACHLOROETHANE	ND	5	2
1,1,2-TRICHLOROETHANE	ND	5	2
1,1-DICHLOROETHANE	ND	5	2
1,1-DICHLOROETHENE	ND	5	2
1,2-DICHLOROETHANE	ND	5	2
1,2-DICHLOROPROPANE	ND	5	2
2-BUTANONE (MEK)	ND	50	5
2-HEXANONE	ND	50	5
2-CHLOROETHYLVINYLETHER	ND	50	2
4-METHYL-2-PENTANONE (MIBK)	ND	50	5
ACETONE	ND	50	5
BENZENE	ND	5	2
BROMODICHLOROMETHANE	ND	5	2
BROMOFORM	ND	5	2
BROMOMETHANE	ND	5	3
CARBON DISULFIDE	ND	5	2
CARBON TETRACHLORIDE	ND	5	2
CHLOROBENZENE	ND	5	2
CHLOROETHANE	ND	5	3
CHLOROFORM	ND	5	2
CHLOROMETHANE	ND	5	5
CIS-1,2-DICHLOROETHENE	ND	5	2
CIS-1,3-DICHLOROPROPENE	ND	5	2
DIBROMOCHLOROMETHANE	ND	5	2
ETHYLBENZENE	ND	5	2
XYLENE,TOTAL	ND	5	3
METHYLENE CHLORIDE	ND	5	2
MTBE	ND	10	2
STYRENE	ND	5	2
TOLUENE	ND	5	2
TRANS-1,2-DICHLOROETHENE	ND	5	2
TRANS-1,3-DICHLOROPROPENE	ND	5	2
TRICHLOROETHENE	ND	5	2
TETRACHLOROETHENE	ND	5	2
VINYL ACETATE	ND	50	2
VINYL CHLORIDE	ND	5	2

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	118	70-130
BROMOFLUOROBENZENE	95	70-130
TOLUENE-D8	95	70-130

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: SW 5030B/8260B

MATRIX:	SOIL			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK3S				
LAB SAMP ID:	V006K42B	V006K42L	V006K42C		
LAB FILE ID:	RKW391	RKW389	RKW390		
DATE EXTRACTED:	11/19/0204:08	11/19/0202:56	11/19/0203:32	DATE COLLECTED:	NA
DATE ANALYZED:	11/19/0204:08	11/19/0202:56	11/19/0203:32	DATE RECEIVED:	11/19/02
PREP. BATCH:	V006K42	V006K42	V006K42		
CALIB. REF:	RKW094	RKW094	RKW094		

ACCESSION:

PARAMETER	BLNK RSLT (ug/kg)	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
1,1-Dichloroethene	ND	20	17.7	89	20	17.6	88	1	65-135	30
Benzene	ND	20	17.6	88	20	18.1	90	3	65-135	30
Chlorobenzene	ND	20	18.8	94	20	19.9	99	6	65-135	30
Toluene	ND	20	18	90	20	18.5	93	3	64-135	30
Trichloroethene	ND	20	17.3	87	20	18.6	93	7	61-135	30

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	SPIKE AMT (ug/kg)	BSD RSLT (ug/kg)	BSD % REC	QC LIMIT (%)
1,2-Dichloroethane-d4	50	57.5	115	50	58	116	70-130
Bromofluorobenzene	50	47.2	94	50	45.9	92	70-130
Toluene-d8	50	46.8	94	50	48.1	96	70-130

SW 3520C/8270C
SEMI VOLATILE ORGANICS BY GC/MS

[redacted]lient	: SHAW E&I	Date Collected:	11/12/02
Project	: EL TORO, CTO 0024	Date Received:	11/12/02
Batch No.	: 02K106	Date Extracted:	11/15/02 11:00
Sample ID:	818655-B3111	Date Analyzed:	11/16/02 13:18
[redacted]ab Samp ID:	K106-09	Dilution Factor:	.94
[redacted]ab File ID:	RKX076	Matrix	: WATER
[redacted]xt Btch ID:	SVK022W	% Moisture	: NA
[redacted]alib. Ref.:	RJX007	Instrument ID	: T-042

[redacted]ARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
[redacted],2,4-TRICHLOROBENZENE	ND	9.4	4.7
1,2-DICHLOROBENZENE	ND	9.4	4.7
1,3-DICHLOROBENZENE	ND	9.4	4.7
[redacted],4-DICHLOROBENZENE	ND	9.4	4.7
[redacted]4,5-TRICHLOROPHENOL	ND	24	4.7
[redacted]4,6-TRICHLOROPHENOL	ND	9.4	4.7
[redacted]4-DICHLOROPHENOL	ND	9.4	4.7
2,4-DIMETHYLPHENOL	ND	9.4	4.7
2,4-DINITROPHENOL	ND	24	9.4
2,4-DINITROTOLUENE	ND	9.4	4.7
[redacted]6-DINITROTOLUENE	ND	9.4	4.7
[redacted]CHLORONAPHTHALENE	ND	9.4	4.7
[redacted]CHLOROPHENOL	ND	9.4	4.7
2-METHYLNAPHTHALENE	ND	9.4	4.7
2-METHYLPHENOL	ND	9.4	4.7
2-NITROANILINE	ND	24	9.4
[redacted]NITROPHENOL	ND	9.4	4.7
[redacted]3'-DICHLOROBENZIDINE	ND	9.4	4.7
[redacted]NITROANILINE	ND	24	4.7
[redacted]6-DINITRO-2-METHYLPHENOL	ND	24	9.4
4-BROMOPHENYL-PHENYL ETHER	ND	9.4	4.7
4-CHLORO-3-METHYLPHENOL	ND	9.4	4.7
[redacted]CHLOROANILINE	ND	9.4	4.7
[redacted]CHLOROPHENYL-PHENYL ETHER	ND	9.4	4.7
[redacted]METHYLPHENOL (1)	ND	9.4	4.7
[redacted]NITROANILINE	ND	24	4.7
4-NITROPHENOL	ND	24	4.7
ACENAPHTHENE	ND	9.4	4.7
ACENAPHTHYLENE	ND	9.4	4.7
[redacted]THRACENE	ND	9.4	4.7
[redacted]NZO(A)ANTHRACENE	ND	9.4	4.7
[redacted]NZO(A)PYRENE	ND	9.4	4.7
BENZO(B)FLUORANTHENE	ND	9.4	4.7
BENZO(K)FLUORANTHENE	ND	9.4	4.7
BENZO(G,H,I)PERYLENE	ND	9.4	4.7
[redacted]S(2-CHLOROETHOXY)METHANE	ND	9.4	4.7
[redacted]S(2-CHLOROETHYL)ETHER	ND	9.4	4.7
[redacted]S(2-CHLOROISOPROPYL)ETHER	ND	9.4	4.7
[redacted]S(2-ETHYLHEXYL)PHTHALATE	ND	19	9.4
BUTYLBENZYLPHTHALATE	ND	9.4	4.7
CHRYSENE	ND	9.4	4.7
[redacted]-N-BUTYLPHTHALATE	ND	9.4	4.7
[redacted]-N-OCTYLPHTHALATE	ND	9.4	4.7
[redacted]BENZO(A,H)ANTHRACENE	ND	9.4	4.7
[redacted]BENZOFURAN	ND	9.4	4.7
DIETHYLPHTHALATE	ND	9.4	4.7
DIMETHYLPHTHALATE	ND	9.4	4.7
[redacted]UORANTHENE	ND	9.4	4.7
[redacted]UORENE	ND	9.4	4.7
[redacted]XACHLOROBENZENE	ND	9.4	4.7
[redacted]XACHLOROBUTADIENE	ND	9.4	4.7
HEXACHLOROCYCLOPENTADIENE	ND	9.4	4.7
HEXACHLOROETHANE	ND	9.4	4.7
INDENO(1,2,3-CD)PYRENE	ND	9.4	4.7
[redacted]ITROSO-DI-N-PROPYLAMINE	ND	9.4	4.7
[redacted]ITROSODIPHENYLAMINE (2)	ND	9.4	4.7
[redacted]PHTHALENE	ND	9.4	4.7
[redacted]TROBENZENE	ND	9.4	4.7
PENTACHLOROPHENOL	ND	9.4	9.4
PHENANTHRENE	ND	9.4	4.7
[redacted]ENOL	ND	9.4	4.7
[redacted]RENE	ND	9.4	4.7

[redacted]RROGATE PARAMETERS	% RECOVERY	QC LIMIT
2,4,6-TRIBROMOPHENOL	109	25-134
[redacted]FLUOROBIPHENYL	86	43-125
[redacted]LUOROPHENOL	78	25-125
[redacted]ROBENZENE-D5	81	32-125
[redacted]NOL-D5	80	25-125
TERPHENYL-D14	103	42-126

[redacted]: Reporting Limit
[redacted]: Cannot be separated from 3-Methylphenol
[redacted]: Cannot be separated from Diphenylamine

SW 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: SHAW E&I	Date Collected:	11/12/02
Project	: EL TORO, CTO 0024	Date Received:	11/12/02
Batch No.	: 02K106	Date Extracted:	11/14/02 15:45
Sample ID	: 818655-B3109	Date Analyzed:	11/16/02 18:41
Lab Samp ID	: K106-07	Dilution Factor:	1
Lab File ID	: RKX086	Matrix	: SOIL
Ext Btch ID	: SVK023S	% Moisture	: 8.0
Calib. Ref.	: RJX007	Instrument ID	: T-042

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
1,2,4-TRICHLOROBENZENE	ND	360	180
1,2-DICHLOROBENZENE	ND	360	180
1,3-DICHLOROBENZENE	ND	360	180
1,4-DICHLOROBENZENE	ND	360	180
2,4,5-TRICHLOROPHENOL	ND	900	180
2,4,6-TRICHLOROPHENOL	ND	360	180
2,4-DICHLOROPHENOL	ND	360	180
2,4-DIMETHYLPHENOL	ND	360	180
2,4-DINITROPHENOL	ND	900	180
2,4-DINITROTOLUENE	ND	360	180
2,6-DINITROTOLUENE	ND	360	180
2-CHLORONAPHTHALENE	ND	360	180
2-CHLOROPHENOL	ND	360	180
2-METHYLNAPHTHALENE	ND	360	180
2-METHYLPHENOL	ND	360	180
2-NITROANILINE	ND	900	180
2-NITROPHENOL	ND	360	180
3,3'-DICHLOROBENZIDINE	ND	360	180
3-NITROANILINE	ND	900	180
4,6-DINITRO-2-METHYLPHENOL	ND	900	180
4-BROMOPHENYL-PHENYL ETHER	ND	360	180
4-CHLORO-3-METHYLPHENOL	ND	360	180
4-CHLOROANILINE	ND	360	180
4-CHLOROPHENYL-PHENYL ETHER	ND	360	180
4-METHYLPHENOL (1)	ND	360	180
4-NITROANILINE	ND	900	180
4-NITROPHENOL	ND	900	180
ACENAPHTHENE	ND	360	180
ACENAPHTHYLENE	ND	360	180
ANTHRACENE	ND	360	180
BENZO(A)ANTHRACENE	ND	360	180
BENZO(B)FLUORANTHENE	ND	360	180
BENZO(K)FLUORANTHENE	ND	360	180
BENZO(G,H,I)PERYLENE	ND	360	180
BIS(2-CHLOROETHOXY)METHANE	ND	360	180
BIS(2-CHLOROISOPROPYL)ETHER	ND	360	180
BIS(2-ETHYLHEXYL)PHTHALATE	ND	360	180
BUTYLBENZYLPHTHALATE	ND	360	180
CHRYSENE	ND	360	180
DI-N-BUTYLPHTHALATE	ND	360	180
DI-N-OCTYLPHTHALATE	ND	360	180
DIBENZOFURAN	ND	360	180
DIETHYLPHTHALATE	ND	360	180
DIMETHYLPHTHALATE	ND	360	180
FLUORANTHENE	ND	360	180
FLUORENE	ND	360	180
HEXACHLOROBUTADIENE	ND	360	180
HEXACHLOROCYCLOPENTADIENE	ND	360	180
HEXACHLOROETHANE	ND	360	180
N-NITROSODIPHENYLAMINE (2)	ND	360	180
NAPHTHALENE	ND	360	180
NITROBENZENE	ND	360	180
PENTACHLOROPHENOL	ND	220	180
PHENANTHRENE	ND	360	180
PHENOL	ND	360	180
PYRENE	ND	360	180

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2,4,6-TRIBROMOPHENOL	105	25-144
2-FLUOROBIPHENYL	77	34-135
2-FLUOROPHENOL	67	25-135
NITROBENZENE-D5	65	25-135
PHENOL-D5	74	25-135
TERPHENYL-D14	82	32-136

RL: Reporting Limit
(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

SW 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: SHAW E&I	Date Collected	: 11/12/02
Project	: EL TORO, CTO 0024	Date Received	: 11/12/02
Batch No.	: 02K106	Date Extracted	: 11/14/02 15:45
[redacted]ample ID	: 818655-B3110	Date Analyzed	: 11/16/02 18:09
[redacted]ab Samp ID	: K106-08	Dilution Factor	: 1
[redacted]ab File ID	: RKX085	Matrix	: SOIL
[redacted]xt Btch ID	: SVK023S	% Moisture	: 12.5
Calib. Ref.	: RJX007	Instrument ID	: T-042

[redacted]ARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
1,2,4-TRICHLOROBENZENE	ND	380	190
1,2-DICHLOROBENZENE	ND	380	190
1,3-DICHLOROBENZENE	ND	380	190
[redacted],4-DICHLOROBENZENE	ND	380	190
[redacted],4,5-TRICHLOROPHENOL	ND	950	190
[redacted],4,6-TRICHLOROPHENOL	ND	380	190
2,4-DICHLOROPHENOL	ND	380	190
2,4-DIMETHYLPHENOL	ND	380	190
2,4-DINITROPHENOL	ND	950	190
[redacted],4-DINITROTOLUENE	ND	380	190
[redacted],6-DINITROTOLUENE	ND	380	190
[redacted]-CHLORONAPHTHALENE	ND	380	190
[redacted]-CHLOROPHENOL	ND	380	190
2-METHYLNAPHTHALENE	ND	380	190
2-METHYLPHENOL	ND	380	190
2-NITROANILINE	ND	950	190
[redacted]-NITROPHENOL	ND	380	190
[redacted],3'-DICHLOROBENZIDINE	ND	380	190
[redacted]-NITROANILINE	ND	950	190
4,6-DINITRO-2-METHYLPHENOL	ND	950	190
4-BROMOPHENYL-PHENYL ETHER	ND	380	190
4-CHLORO-3-METHYLPHENOL	ND	380	190
[redacted]-CHLOROANILINE	ND	380	190
[redacted]-CHLOROPHENYL-PHENYL ETHER	ND	380	190
[redacted]-METHYLPHENOL (1)	ND	380	190
4-NITROANILINE	ND	950	190
4-NITROPHENOL	ND	950	190
ACENAPHTHENE	ND	380	190
[redacted]CENAPHTHYLENE	ND	380	190
[redacted]NTHRACENE	ND	380	190
[redacted]ENZO(A)ANTHRACENE	ND	380	190
[redacted]ENZO(B)FLUORANTHENE	ND	380	190
BENZO(K)FLUORANTHENE	ND	380	190
BENZO(G,H,I)PERYLENE	ND	380	190
[redacted]IS(2-CHLOROETHOXY)METHANE	ND	380	190
[redacted]IS(2-CHLOROISOPROPYL)ETHER	ND	380	190
[redacted]IS(2-ETHYLHEXYL)PHTHALATE	ND	380	190
[redacted]UTYLBENZYLPHTHALATE	ND	380	190
CHRYSENE	ND	380	190
DI-N-BUTYLPHTHALATE	ND	380	190
DI-N-OCTYLPHTHALATE	ND	380	190
[redacted]IBENZOFURAN	ND	380	190
[redacted]IETHYLPHTHALATE	ND	380	190
[redacted]IMETHYLPHTHALATE	ND	380	190
FLUORANTHENE	ND	380	190
FLUORENE	ND	380	190
HEXACHLOROBUTADIENE	ND	380	190
[redacted]EXACHLOROCYCLOPENTADIENE	ND	380	190
[redacted]EXACHLOROETHANE	ND	380	190
[redacted]-NITROSODIPHENYLAMINE (2)	ND	380	190
[redacted]APHTHALENE	ND	380	190
NITROBENZENE	ND	380	190
PENTACHLOROPHENOL	ND	230	190
[redacted]HENANTHRENE	ND	380	190
[redacted]HENOL	ND	380	190
[redacted]YRENE	ND	380	190

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
[redacted],4,6-TRIBROMOPHENOL	100	25-144
[redacted]-FLUOROBIPHENYL	66	34-135
[redacted]-FLUOROPHENOL	57	25-135
[redacted]ITROBENZENE-D5	58	25-135
PHENOL-D5	63	25-135
TERPHENYL-D14	85	32-136

[redacted]: Reporting Limit
[redacted]): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

SW 3520C/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: SHAW E&I	Date Collected	: NA
Project	: EL TORO, CTO 0024	Date Received	: NA
Batch No.	: 02K106	Date Extracted	: 11/15/02 11:00
Sample ID	: MBLK1W	Date Analyzed	: 11/16/02 11:41
Lab Samp ID	: SVK022WB	Dilution Factor	: 1
Lab File ID	: RKX073	Matrix	: WATER
Ext Btch ID	: SVK022W	% Moisture	: NA
Calib. Ref.	: RJX007	Instrument ID	: T-042

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
1,2,4-TRICHLOROBENZENE	ND	10	5
1,2-DICHLOROBENZENE	ND	10	5
1,3-DICHLOROBENZENE	ND	10	5
1,4-DICHLOROBENZENE	ND	10	5
2,4,5-TRICHLOROPHENOL	ND	25	5
2,4,6-TRICHLOROPHENOL	ND	10	5
2,4-DICHLOROPHENOL	ND	10	5
2,4-DIMETHYLPHENOL	ND	10	5
2,4-DINITROPHENOL	ND	25	10
2,4-DINITROTOLUENE	ND	10	5
2,6-DINITROTOLUENE	ND	10	5
2-CHLORONAPHTHALENE	ND	10	5
2-CHLOROPHENOL	ND	10	5
2-METHYLNAPHTHALENE	ND	10	5
2-METHYLPHENOL	ND	10	5
2-NITROANILINE	ND	25	10
2-NITROPHENOL	ND	10	5
3,3'-DICHLOROBENZIDINE	ND	10	5
3-NITROANILINE	ND	25	5
4,6-DINITRO-2-METHYLPHENOL	ND	25	10
4-BROMOPHENYL-PHENYL ETHER	ND	10	5
4-CHLORO-3-METHYLPHENOL	ND	10	5
4-CHLOROANILINE	ND	10	5
4-CHLOROPHENYL-PHENYL ETHER	ND	10	5
4-METHYLPHENOL (1)	ND	10	5
4-NITROANILINE	ND	25	5
4-NITROPHENOL	ND	25	5
ACENAPHTHENE	ND	10	5
ACENAPHTHYLENE	ND	10	5
ANTHRACENE	ND	10	5
BENZO(A)ANTHRACENE	ND	10	5
BENZO(A)PYRENE	ND	10	5
BENZO(B)FLUORANTHENE	ND	10	5
BENZO(K)FLUORANTHENE	ND	10	5
BENZO(G,H,I)PERYLENE	ND	10	5
BIS(2-CHLOROETHOXY)METHANE	ND	10	5
BIS(2-CHLOROETHYL)ETHER	ND	10	5
BIS(2-CHLOROISOPROPYL)ETHER	ND	10	5
BIS(2-ETHYLHEXYL)PHTHALATE	ND	20	10
BUTYLBENZYLPHTHALATE	ND	10	5
CHRYSENE	ND	10	5
DI-N-BUTYLPHTHALATE	ND	10	5
DI-N-OCTYLPHTHALATE	ND	10	5
DIBENZO(A,H)ANTHRACENE	ND	10	5
DIBENZOFURAN	ND	10	5
DIETHYLPHTHALATE	ND	10	5
DIMETHYLPHTHALATE	ND	10	5
FLUORANTHENE	ND	10	5
FLUORENE	ND	10	5
HEXACHLOROBENZENE	ND	10	5
HEXACHLOROBUTADIENE	ND	10	5
HEXACHLOROCYCLOPENTADIENE	ND	10	5
HEXACHLOROETHANE	ND	10	5
INDENO(1,2,3-CD)PYRENE	ND	10	5
N-NITROSO-DI-N-PROPYLAMINE	ND	10	5
N-NITROSODIPHENYLAMINE (2)	ND	10	5
NAPHTHALENE	ND	10	5
NITROBENZENE	ND	10	5
PENTACHLOROPHENOL	ND	10	10
PHENANTHRENE	ND	10	5
PHENOL	ND	10	5
PYRENE	ND	10	5

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2,4,6-TRIBROMOPHENOL	101	25-134
2-FLUOROBIPHENYL	80	43-125
2-FLUOROPHENOL	72	25-125
NITROBENZENE-D5	76	32-125
PHENOL-D5	77	25-125
TERPHENYL-D14	95	42-126

RL: Reporting Limit
(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

LIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: METHOD 3520B/8270B

ATRIX:	WATER			% MOISTURE:	NA
ILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1W				
LAB SAMP ID:	SVK022WB	SVK022WL	SVK022WC		
AB FILE ID:	RKX073	RKX074	RKX075		
ATE EXTRACTED:	11/15/0211:00	11/15/0211:00	11/15/0211:00	DATE COLLECTED:	NA
ATE ANALYZED:	11/16/0211:41	11/16/0212:13	11/16/0212:46	DATE RECEIVED:	NA
REP. BATCH:	SVK022W	SVK022W	SVK022W		
CALIB. REF:	RJX007	RJX007	RJX007		

ACCESSION:

ARAMETER	BLNK RSLT (ug/L)	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
1,2,4-Trichlorobenzene	ND	100	74.9	75	100	72.1	72	4	44-142	20
1,4-Dichlorobenzene	ND	100	71.5	71	100	69.7	70	2	30-125	20
4-Dinitrotoluene	ND	100	97.2	97	100	93.9	94	3	39-139	20
Chlorophenol	ND	150	113	76	150	110	73	3	41-125	20
Chloro-3-Methylphenol	ND	150	123	82	150	121	81	2	44-125	20
-Nitrophenol	ND	150	90	60	150	90.4	60	1	25-131	20
Acenaphthene	ND	100	90.2	90	100	90	90	0	49-125	20
N-Nitroso-di-n-propylamine	ND	100	87.6	88	100	89.5	89	2	37-125	20
ntachlorophenol	ND	150	130	87	150	131	88	1	28-136	20
enol	ND	150	103	69	150	104	69	1	25-125	20
rene	ND	100	95.2	95	100	91.2	91	4	47-136	20

RROGATE PARAMETER	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	QC LIMIT (%)
2,4,6-Tribromophenol	150	166	111	150	156	104	25-134
2-Fluorobiphenyl	100	81.1	81	100	79.6	80	43-125
2-Fluorophenol	150	107	71	150	99.8	67	25-125
trobenzene-d5	100	79.2	79	100	73.4	73	32-125
enol-d5	150	113	76	150	110	73	25-125
rphenyl-d14	100	96.1	96	100	91	91	42-126

SW 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: SHAW E&I	Date Collected:	NA
Project	: EL TORO, CTO 0024	Date Received:	NA
Batch No.	: 02K106	Date Extracted:	11/14/02 15:45
Sample ID:	MBLK1S	Date Analyzed:	11/16/02 13:50
Lab Samp ID:	SVK023SB	Dilution Factor:	1
Lab File ID:	RKX077	Matrix :	SOIL
Ext Btch ID:	SVK023S	% Moisture :	NA
Calib. Ref.:	RJX007	Instrument ID :	T-042

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
1,2,4-TRICHLOROBENZENE	ND	330	170
1,2-DICHLOROBENZENE	ND	330	170
1,3-DICHLOROBENZENE	ND	330	170
1,4-DICHLOROBENZENE	ND	330	170
2,4,5-TRICHLOROPHENOL	ND	830	170
2,4,6-TRICHLOROPHENOL	ND	330	170
2,4-DICHLOROPHENOL	ND	330	170
2,4-DIMETHYLPHENOL	ND	330	170
2,4-DINITROPHENOL	ND	830	170
2,4-DINITROTOLUENE	ND	330	170
2,6-DINITROTOLUENE	ND	330	170
2-CHLORONAPHTHALENE	ND	330	170
2-CHLOROPHENOL	ND	330	170
2-METHYLNAPHTHALENE	ND	330	170
2-METHYLPHENOL	ND	330	170
2-NITROANILINE	ND	830	170
2-NITROPHENOL	ND	330	170
3,3'-DICHLOROBENZIDINE	ND	330	170
3-NITROANILINE	ND	830	170
4,6-DINITRO-2-METHYLPHENOL	ND	830	170
4-BROMOPHENYL-PHENYL ETHER	ND	330	170
4-CHLORO-3-METHYLPHENOL	ND	330	170
4-CHLOROANILINE	ND	330	170
4-CHLOROPHENYL-PHENYL ETHER	ND	330	170
4-METHYLPHENOL (1)	ND	330	170
4-NITROANILINE	ND	830	170
4-NITROPHENOL	ND	830	170
ACENAPHTHENE	ND	330	170
ACENAPHTHYLENE	ND	330	170
ANTHRACENE	ND	330	170
BENZO(A)ANTHRACENE	ND	330	170
BENZO(B)FLUORANTHENE	ND	330	170
BENZO(K)FLUORANTHENE	ND	330	170
BENZO(G,H,I)PERYLENE	ND	330	170
BIS(2-CHLOROETHOXY)METHANE	ND	330	170
BIS(2-CHLOROISOPROPYL)ETHER	ND	330	170
BIS(2-ETHYLHEXYL)PHTHALATE	ND	330	170
BUTYLBENZYLPHTHALATE	ND	330	170
CHRYSENE	ND	330	170
DI-N-BUTYLPHTHALATE	ND	330	170
DI-N-OCTYLPHTHALATE	ND	330	170
DIBENZOFURAN	ND	330	170
DIETHYLPHTHALATE	ND	330	170
DIMETHYLPHTHALATE	ND	330	170
FLUORANTHENE	ND	330	170
FLUORENE	ND	330	170
HEXACHLOROBUTADIENE	ND	330	170
HEXACHLOROCYCLOPENTADIENE	ND	330	170
HEXACHLOROETHANE	ND	330	170
N-NITROSODIPHENYLAMINE (2)	ND	330	170
NAPHTHALENE	ND	330	170
NITROBENZENE	ND	330	170
PENTACHLOROPHENOL	ND	200	170
PHENANTHRENE	ND	330	170
PHENOL	ND	330	170
PYRENE	ND	330	170

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2,4,6-TRIBROMOPHENOL	101	25-144
2-FLUOROBIPHENYL	90	34-135
2-FLUOROPHENOL	78	25-135
NITROBENZENE-D5	85	25-135
PHENOL-D5	83	25-135
TERPHENYL-D14	99	32-136

RL: Reporting Limit
(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

EMAX QUALITY CONTROL DATA
LCS ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: METHOD 3550A/8270B

MATRIX:	SOIL		% MOISTURE:	NA
DILUTION FACTOR:	1	1		
SAMPLE ID:	MBLK1S			
LAB SAMP ID:	SVK023SB	SVK023SL		
LAB FILE ID:	RKX077	RKX078		
DATE EXTRACTED:	11/14/0215:45	11/14/0215:45	DATE COLLECTED:	NA
DATE ANALYZED:	11/16/0213:50	11/16/0214:23	DATE RECEIVED:	NA
PREP. BATCH:	SVK023S	SVK023S		
CALIB. REF:	RJX007	RJX007		

ACCESSION:

PARAMETER	BLNK RSLT (ug/kg)	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	QC LIMIT (%)
1,2,4-Trichlorobenzene	ND	3330	2690	81	34-152
1,4-Dichlorobenzene	ND	3330	2680	80	25-135
2,4-Dinitrotoluene	ND	3330	2920	88	29-149
2-Chlorophenol	ND	5000	3940	79	31-135
4-Chloro-3-Methylphenol	ND	5000	3960	79	34-135
4-Nitrophenol	ND	5000	2690	54	25-141
Acenaphthene	ND	3330	2990	90	39-135
Pentachlorophenol	ND	5000	3760	75	38-146
Phenol	ND	5000	3780	76	25-135
Pyrene	ND	3330	3040	91	37-146

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	QC LIMIT (%)
2,4,6-Tribromophenol	5000	4440	89	25-144
2-Fluorobiphenyl	3330	2490	75	34-135
2-Fluorophenol	5000	3610	72	25-135
Nitrobenzene-d5	3330	2410	72	25-135
Phenol-d5	5000	3710	74	25-135
Terphenyl-d14	3330	2730	82	32-136

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: METHOD 3550A/8270B

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MATRIX:	SOIL			% MOISTURE:	11.4
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	818655-B3114				
LAB SAMP ID:	K106-11	K106-11M	K106-11S		
LAB FILE ID:	RKX081	RKX079	RKX080		
DATE EXTRACTED:	11/14/0215:45	11/14/0215:45	11/14/0215:45	DATE COLLECTED:	11/12/02
DATE ANALYZED:	11/16/0216:00	11/16/0214:55	11/16/0215:28	DATE RECEIVED:	11/12/02
PREP. BATCH:	SVK023S	SVK023S	SVK023S		
CALIB. REF:	RJX007	RJX007	RJX007		

ACCESSION:

PARAMETER	SMPL RSLT (ug/kg)	SPIKE AMT (ug/kg)	MS RSLT (ug/kg)	MS % REC	SPIKE AMT (ug/kg)	MSD RSLT (ug/kg)	MSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
1,2,4-Trichlorobenzene	ND	3760	2860	76	3760	2720	72	5	34-152	30
1,4-Dichlorobenzene	ND	3760	2770	74	3760	2620	70	6	25-135	30
2,4-Dinitrotoluene	ND	3760	3190	85	3760	3070	82	4	29-149	30
2-Chlorophenol	ND	5640	4240	75	5640	3980	71	6	31-135	30
4-Chloro-3-Methylphenol	ND	5640	4360	77	5640	4290	76	2	34-135	30
4-Nitrophenol	ND	5640	3020	53	5640	3060	54	1	25-141	30
Acenaphthene	ND	3760	3250	86	3760	3210	86	1	39-135	30
Pentachlorophenol	ND	5640	4330	77	5640	4240	75	2	38-146	30
Phenol	ND	5640	4010	71	5640	3850	68	4	25-135	30
Pyrene	ND	3760	3240	86	3760	3040	81	6	37-146	30

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SURROGATE PARAMETER	SPIKE AMT (ug/kg)	MS RSLT (ug/kg)	MS % REC	SPIKE AMT (ug/kg)	MSD RSLT (ug/kg)	MSD % REC	QC LIMIT (%)
2,4,6-Tribromophenol	5640	5140	91	5640	5830	103	25-144
2-Fluorobiphenyl	3760	2920	78	3760	3080	82	34-135
2-Fluorophenol	5640	3990	71	5640	4340	77	25-135
Nitrobenzene-d5	3760	2640	70	3760	2930	78	25-135
Phenol-d5	5640	4140	73	5640	4490	80	25-135
Terphenyl-d14	3760	3060	81	3760	3310	88	32-136

SW 3550B/8270C SIM

SEMI VOLATILE ORGANICS BY GC/MS/SIM

Client	: SHAW E&I	Date Collected:	11/12/02
Project	: EL TORO, CTO 0024	Date Received:	11/12/02
Batch No.	: 02K106	Date Extracted:	11/14/02 15:45
Sample ID:	818655-B3109	Date Analyzed:	11/18/02 21:03
Lab Samp ID:	K106-07	Dilution Factor:	1
Lab File ID:	RKZ192	Matrix	: SOIL
Ext Btch ID:	SVK023S	% Moisture	: 8.0
Calib. Ref.:	RJZ052	Instrument ID	: T-048

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZO(A)PYRENE	ND	36	11
BIS(2-CHLOROETHYL)ETHER	ND	36	16
DIBENZO(A,H)ANTHRACENE	ND	36	11
HEXACHLOROBENZENE	ND	82	11
INDENO(1,2,3-CD)PYRENE	ND	38	11
N-NITROSO-DI-N-PROPYLAMINE	ND	36	11

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	116	32-136

RL: Reporting Limit

(1): Cannot be separated from 3-Methylphenol

(2): Cannot be separated from Diphenylamine

SW 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS/SIM

Client	: SHAW E&I	Date Collected:	11/12/02
Project	: EL TORO, CTO 0024	Date Received:	11/12/02
Batch No.	: 02K106	Date Extracted:	11/14/02 15:45
Sample ID:	818655-B3110	Date Analyzed:	11/18/02 21:33
Lab Samp ID:	K106-08	Dilution Factor:	1
Lab File ID:	RKZ193	Matrix :	SOIL
Ext Btch ID:	SVK023S	% Moisture :	12.5
Calib. Ref.:	RJZ052	Instrument ID :	T-048

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZO(A)PYRENE	ND	38	11
BIS(2-CHLOROETHYL)ETHER	ND	38	17
DIBENZO(A,H)ANTHRACENE	ND	38	11
HEXACHLOROBENZENE	ND	86	11
INDENO(1,2,3-CD)PYRENE	ND	40	11
N-NITROSO-DI-N-PROPYLAMINE	ND	38	11

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	121	32-136

RL: Reporting Limit
(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

SW 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS/SIM

Client	: SHAW E&I	Date Collected	: NA
Project	: EL TORO, CTO 0024	Date Received	: NA
Batch No.	: 02K106	Date Extracted	: 11/14/02 15:45
Sample ID	: MBLK1S	Date Analyzed	: 11/18/02 17:04
Lab Samp ID	: SVK023SB	Dilution Factor	: 1
Lab File ID	: RKZ184	Matrix	: SOIL
Ext Btch ID	: SVK023S	% Moisture	: NA
Calib. Ref.	: RJZ052	Instrument ID	: T-048

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZO(A)PYRENE	ND	33	10
BIS(2-CHLOROETHYL)ETHER	ND	33	15
DIBENZO(A,H)ANTHRACENE	ND	33	10
HEXACHLOROBENZENE	ND	75	10
INDENO(1,2,3-CD)PYRENE	ND	35	10
N-NITROSO-DI-N-PROPYLAMINE	ND	33	10

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	125	32-136

RL: Reporting Limit
(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

EMAX QUALITY CONTROL DATA
LCS ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: SW 3550B/8270C SIM

MATRIX:	SOIL		% MOISTURE:	NA
DILUTION FACTOR:	1	2		
SAMPLE ID:	MBLK1S			
LAB SAMP ID:	SVK023SB	SVK023SL		
LAB FILE ID:	RKZ184	RKZ185		
DATE EXTRACTED:	11/14/0215:45	11/14/0215:45	DATE COLLECTED:	NA
DATE ANALYZED:	11/18/0217:04	11/18/0217:34	DATE RECEIVED:	NA
PREP. BATCH:	SVK023S	SVK023S		
CALIB. REF:	RJZ052	RJZ052		

ACCESSION:

PARAMETER	BLNK RSLT (ug/kg)	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	QC LIMIT (%)
n-Nitroso-di-n-propylamine	ND	3330	3450	104	27-135

SURROGATE PARAMETER	SPIKE AMT (ug/kg)	BS RSLT (ug/kg)	BS % REC	QC LIMIT (%)
Terphenyl-d14	3330	3930	118	32-136

EMAX QUALITY CONTROL DATA
MS/MSD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
ATCH NO.: 02K106
ETHOD: SW 3550B/8270C SIM

ATRIX:	SOIL			% MOISTURE:	11.4
ILUTION FACTOR:	1	2	2		
SAMPLE ID:	818655-B3114				
LAB SAMP ID:	K106-11	K106-11M	K106-11S		
AB FILE ID:	RKZ191	RKZ186	RKZ187		
ATE EXTRACTED:	11/14/0215:45	11/14/0215:45	11/14/0215:45	DATE COLLECTED:	11/12/02
DATE ANALYZED:	11/18/0220:34	11/18/0218:04	11/18/0218:34	DATE RECEIVED:	11/12/02
PREP. BATCH:	SVK023S	SVK023S	SVK023S		
ALIB. REF:	RJZ052	RJZ052	RJZ052		

ACCESSION:

ARAMETER	SMPL RSLT (ug/kg)	SPIKE AMT (ug/kg)	MS RSLT (ug/kg)	MS % REC	SPIKE AMT (ug/kg)	MSD RSLT (ug/kg)	MSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
n-Nitroso-di-n-propylamine	ND	3760	3810	101	3760	3360	89	12	27-135	30

URROGATE PARAMETER	SPIKE AMT (ug/kg)	MS RSLT (ug/kg)	MS % REC	SPIKE AMT (ug/kg)	MSD RSLT (ug/kg)	MSD % REC	QC LIMIT (%)
Terphenyl-d14	3760	4110	109	3760	4450	118	32-136

METHOD 3010A/6010B
METALS BY ICP

Client : SHAW E&I	Date Collected: 11/12/02
Project : EL TORO, CTO 0024	Date Received: 11/12/02
SDG NO. : 02K106	Date Extracted: 11/14/02 14:10
Sample ID: 818655-B3111	Date Analyzed: 11/18/02 16:46
Lab Samp ID: K106-09	Dilution Factor: 1
Lab File ID: I07K034024	Matrix : WATER
Ext Btch ID: IPK046W	% Moisture : NA
Calib. Ref.: I07K034014	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
Aluminum	ND	500	61
Antimony	ND	500	40
Barium	ND	100	2
Beryllium	ND	10	1.0
Cadmium	ND	5	2
Calcium	975J	1000	32
Chromium	ND	50	6
Cobalt	ND	50	11
Copper	ND	50	5
Iron	32.1J	1000	25
Magnesium	928J	1000	54
Manganese	ND	20	3
Molybdenum	ND	100	7
Nickel	ND	150	10
Potassium	ND	5000	750
Silver	ND	50	11
Sodium	4710	1000	70
Vanadium	ND	100	5
Zinc	ND	20	5

RL: Reporting Limit

METHOD 3010A/6010B
METALS BY ICP

Client	: SHAW E&I	Date Collected:	11/12/02
Project	: EL TORO, CTO 0024	Date Received:	11/12/02
SDG NO.	: 02K106	Date Extracted:	11/14/02 14:10
Sample ID:	818655-B3111	Date Analyzed:	11/15/02 14:43
Lab Samp ID:	K106-09	Dilution Factor:	1
Lab File ID:	I31K025023	Matrix	: WATER
Ext Btch ID:	IPK046W	% Moisture	: NA
Calib. Ref.:	I31K025014	Instrument ID	: EMAXTI31

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
Arsenic	ND	5	4
Lead	ND	5	2
Selenium	ND	5	5
Thallium	ND	10	6

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client	: SHAW E&I	Date Collected:	11/12/02
Project	: EL TORO, CTO 0024	Date Received:	11/12/02
SDG NO.	: 02K106	Date Extracted:	11/14/02 16:30
Sample ID:	818655-B3109	Date Analyzed:	11/18/02 17:45
Lab Samp ID:	K106-07	Dilution Factor:	1
Lab File ID:	I07K034035	Matrix	: SOIL
Ext Btch ID:	IPK048S	% Moisture	: 8.0
Calib. Ref.:	I07K034025	Instrument ID	: EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	16700	54.3	4.87
Antimony	ND	5.43	2.29
Barium	134	1.09	.135
Beryllium	.651	.217	.128
Cadmium	ND	.543	.393
Calcium	9850	109	7.39
Chromium	12.4	2.17	.667
Cobalt	6.6	1.09	.751
Copper	8.33	2.17	.513
Iron	15700	21.7	1.66
Magnesium	7640	109	8.69
Manganese	228	2.17	.204
Molybdenum	1.37J	5.43	.802
Nickel	6.6	2.17	.598
Potassium	4020	109	77.8
Silver	ND	2.17	.683
Sodium	208	109	7.62
Vanadium	38.8	2.17	.476
Zinc	47.7	1.09	.313

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client	: SHAW E&I	Date Collected:	11/12/02
Project	: EL TORO, CTO 0024	Date Received:	11/12/02
SDG NO.	: 02K106	Date Extracted:	11/14/02 16:30
Sample ID:	818655-B3109	Date Analyzed:	11/15/02 15:48
Lab Samp ID:	K106-07	Dilution Factor:	1
Lab File ID:	I31K025036	Matrix	: SOIL
Ext Btch ID:	IPK048S	% Moisture	: 8.0
Calib. Ref.:	I31K025026	Instrument ID	: EMAXTI31

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Arsenic	3.39	1.09	.228
Lead	4.56	1.09	.189
Selenium	ND	1.09	.31
Thallium	ND	1.09	.332

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client : SHAW E&I	Date Collected: 11/12/02
Project : EL TORO, CTO 0024	Date Received: 11/12/02
SDG NO. : 02K106	Date Extracted: 11/14/02 16:30
Sample ID: 818655-B3110	Date Analyzed: 11/18/02 17:51
Lab Samp ID: K106-08	Dilution Factor: 1
Lab File ID: I07K034036	Matrix : SOIL
Ext Btch ID: IPK048S	% Moisture : 12.5
Calib. Ref.: I07K034025	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	14700	57.1	5.12
Antimony	ND	5.71	2.4
Barium	147	1.14	.142
Beryllium	.549	.229	.135
Cadmium	ND	.571	.414
Calcium	4860	114	7.77
Chromium	12.5	2.29	.702
Cobalt	6.71	1.14	.79
Copper	7.96	2.29	.539
Iron	14600	22.9	1.74
Magnesium	6340	114	9.13
Manganese	242	2.29	.215
Molybdenum	1.24J	5.71	.843
Nickel	6.51	2.29	.629
Potassium	4570	114	81.8
Silver	ND	2.29	.718
Sodium	197	114	8.01
Vanadium	36.9	2.29	.501
Zinc	47.3	1.14	.329

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client : SHAW E&I	Date Collected: 11/12/02
Project : EL TORO, CTO 0024	Date Received: 11/12/02
SDG NO. : 02K106	Date Extracted: 11/14/02 16:30
Sample ID: 818655-B3110	Date Analyzed: 11/15/02 15:53
Lab Samp ID: K106-08	Dilution Factor: 1
Lab File ID: I31K025037	Matrix : SOIL
Ext Btch ID: IPK048S	% Moisture : 12.5
Calib. Ref.: I31K025026	Instrument ID : EMAXTI31

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Arsenic	2.91	1.14	.24
Lead	4.2	1.14	.199
Selenium	.563J	1.14	.326
Thallium	ND	1.14	.349

RL: Reporting Limit

METHOD 3010A/6010B
METALS BY ICP

Client : SHAW E&I	Date Collected: NA
Project : EL TORO, CTO 0024	Date Received: 11/14/02
SDG NO. : 02K106	Date Extracted: 11/14/02 14:10
Sample ID: MBLK1W	Date Analyzed: 11/18/02 16:04
Lab Samp ID: IPK046WB	Dilution Factor: 1
Lab File ID: I07K034016	Matrix : WATER
Ext Btch ID: IPK046W	% Moisture : NA
Calib. Ref.: I07K034014	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
Aluminum	ND	500	61
Antimony	ND	500	40
Barium	ND	100	2
Beryllium	ND	10	1.0
Cadmium	ND	5	2
Calcium	ND	1000	32
Chromium	ND	50	6
Cobalt	ND	50	11
Copper	ND	50	5
Iron	ND	1000	25
Magnesium	ND	1000	54
Manganese	ND	20	3
Molybdenum	ND	100	7
Nickel	ND	150	10
Potassium	ND	5000	750
Silver	ND	50	11
Sodium	ND	1000	70
Vanadium	ND	100	5
Zinc	ND	20	5

RL: Reporting Limit

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
SDG NO.: 02K106
METHOD: METHOD 3010A/6010B

MATRIX:	WATER			% MOISTURE:	NA
DILTN FACTR:	1	1	1		
SAMPLE ID:	MBLK1W				
CONTROL NO.:	IPK046WB	IPK046WL	IPK046WC		
LAB FILE ID:	I07K034016	I07K034017	I07K034018		
DATIME EXTRCTD:	11/14/0214:10	11/14/0214:10	11/14/0214:10	DATE COLLECTED:	NA
DATIME ANALYZD:	11/18/0216:04	11/18/0216:10	11/18/0216:15	DATE RECEIVED:	11/14/02
PREP. BATCH:	IPK046W	IPK046W	IPK046W		
CALIB. REF:	I07K034014	I07K034014	I07K034014		

ACCESSION:

PARAMETER	BLNK RSLT ug/L	SPIKE AMT ug/L	BS RSLT ug/L	BS % REC	SPIKE AMT ug/L	BSD RSLT ug/L	BSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	ND	10000	9940	99	10000	9880	99	1	80-120	15
Antimony	ND	5000	4700	94	5000	4710	94	0	80-120	15
Barium	ND	1000	916	92	1000	911	91	1	80-120	15
Beryllium	ND	1000	992	99	1000	985	98	1	80-120	15
Cadmium	ND	1000	1000	100	1000	996	100	1	80-120	15
Calcium	ND	50000	48300	97	50000	48000	96	1	80-120	15
Chromium	ND	1000	966	97	1000	956	96	1	80-120	15
Cobalt	ND	1000	962	96	1000	957	96	0	80-120	15
Copper	ND	1000	996	100	1000	992	99	0	80-120	15
Iron	ND	10000	9650	97	10000	9590	96	1	80-120	15
Magnesium	ND	50000	49200	98	50000	49400	99	0	80-120	15
Manganese	ND	1000	966	97	1000	959	96	1	80-120	15
Molybdenum	ND	1000	912	91	1000	909	91	0	80-120	15
Nickel	ND	1000	958	96	1000	952	95	1	80-120	15
Potassium	ND	50000	49500	99	50000	49300	99	0	80-120	15
Silver	ND	1000	1010	101	1000	1000	100	0	80-120	15
Sodium	ND	50000	49500	99	50000	49200	98	0	80-120	15
Vanadium	ND	1000	978	98	1000	973	97	1	80-120	15
Zinc	ND	1000	1020	102	1000	1010	101	1	80-120	15

METHOD 3010A/6010B
METALS BY ICP

:lient	: SHAW E&I	Date Collected:	NA
roject	: EL TORO, CTO 0024	Date Received:	11/14/02
)G NO.	: 02K106	Date Extracted:	11/14/02 14:10
Sample ID:	MBLK1W	Date Analyzed:	11/15/02 14:10
.ab Samp ID:	IPK046WB	Dilution Factor:	1
ab File ID:	I31K025016	Matrix	: WATER
xt Btch ID:	IPK046W	% Moisture	: NA
:alib. Ref.:	I31K025014	Instrument ID	: EMAXTI31

'ARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
rsenic	ND	5	4
ead	ND	5	2
;elenium	ND	5	5
hallium	ND	10	6

.: Reporting Limit

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
SDG NO.: 02K106
METHOD: METHOD 3010A/6010B

==

MATRIX:	WATER			% MOISTURE:	NA
DILTN FACTR:	1	1	1		
SAMPLE ID:	MBLK1W				
CONTROL NO.:	IPK046WB	IPK046WL	IPK046WC		
LAB FILE ID:	I31K025016	I31K025017	I31K025018		
DATIME EXTRCTD:	11/14/0214:10	11/14/0214:10	11/14/0214:10	DATE COLLECTED:	NA
DATIME ANALYZD:	11/15/0214:10	11/15/0214:14	11/15/0214:19	DATE RECEIVED:	11/14/02
PREP. BATCH:	IPK046W	IPK046W	IPK046W		
CALIB. REF:	I31K025014	I31K025014	I31K025014		

ACCESSION:

PARAMETER	BLNK RSLT ug/L	SPIKE AMT ug/L	BS RSLT ug/L	BS % REC	SPIKE AMT ug/L	BSD RSLT ug/L	BSD % REC	RPD %	QC LIMIT %	MAX RPD %
Arsenic	ND	1000	1010	101	1000	1020	102	0	80-120	15
Lead	ND	1000	920	92	1000	922	92	0	80-120	15
Selenium	ND	1000	1060	106	1000	1060	106	0	80-120	15
Thallium	ND	1000	921	92	1000	928	93	1	80-120	15

METHOD 3050B/6010B
METALS BY ICP

Client : SHAW E&I		Date Collected: NA	
Project : EL TORO, CTO 0024		Date Received: 11/14/02	
SDG NO. : 02K106		Date Extracted: 11/14/02 16:30	
Sample ID: MBLK1S		Date Analyzed: 11/18/02 17:01	
Lab Samp ID: IPK048SB		Dilution Factor: 1	
Lab File ID: I07K034027		Matrix : SOIL	
Ext Btch ID: IPK048S		% Moisture : NA	
Calib. Ref.: I07K034025		Instrument ID : EMAXTI07	

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	ND	50	4.48
Antimony	ND	5	2.1
Barium	ND	1	.124
Beryllium	ND	.2	.118
Cadmium	ND	.5	.362
Calcium	ND	100	6.8
Chromium	ND	2	.614
Cobalt	ND	1	.691
Copper	ND	2	.472
Iron	ND	20	1.53
Magnesium	ND	100	7.99
Manganese	ND	2	.188
Molybdenum	ND	5	.738
Nickel	ND	2	.55
Potassium	ND	100	71.6
Silver	ND	2	.628
Sodium	ND	100	7.01
Vanadium	ND	2	.438
Zinc	ND	1	.288

RL: Reporting Limit

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
SDG NO.: 02K106
METHOD: METHOD 3050B/6010B

MATRIX:	SOIL			% MOISTURE:	NA
DILTN FACTR:	1	1	1		
SAMPLE ID:	MBLK1S				
CONTROL NO.:	IPK048SB	IPK048SL	IPK048SC		
LAB FILE ID:	I07K034027	I07K034028	I07K034029		
DATIME EXTRCTD:	11/14/0216:30	11/14/0216:30	11/14/0216:30	DATE COLLECTED:	NA
DATIME ANALYZD:	11/18/0217:01	11/18/0217:07	11/18/0217:12	DATE RECEIVED:	11/14/02
PREP. BATCH:	IPK048S	IPK048S	IPK048S		
CALIB. REF:	I07K034025	I07K034025	I07K034025		

ACCESSION:

PARAMETER	BLNK RSLT mg/kg	SPIKE AMT mg/kg	BS RSLT mg/kg	BS % REC	SPIKE AMT mg/kg	BSD RSLT mg/kg	BSD % REC	RPD %	QC LIMIT %	MAX RPD %
Aluminum	ND	1000	908	91	1000	895	89	2	80-120	25
Antimony	ND	500	430	86	500	423	85	2	80-120	25
Barium	ND	100	86.1	86	100	84.2	84	2	80-120	25
Beryllium	ND	100	92.6	93	100	91.1	91	2	80-120	25
Cadmium	ND	100	86.7	87	100	86.4	86	0	80-120	25
Calcium	ND	5000	4370	87	5000	4350	87	1	80-120	25
Chromium	ND	100	88.6	89	100	87.6	88	1	80-120	25
Cobalt	ND	100	86.9	87	100	86.6	87	0	80-120	25
Copper	ND	100	91.1	91	100	89.4	89	2	80-120	25
Iron	ND	1000	886	89	1000	875	88	1	80-120	25
Magnesium	ND	5000	4450	89	5000	4470	89	0	80-120	25
Manganese	ND	100	88.1	88	100	87.2	87	1	80-120	25
Molybdenum	ND	100	85.9	86	100	85.3	85	1	80-120	25
Nickel	ND	100	86.3	86	100	85.9	86	0	80-120	25
Potassium	ND	5000	4470	89	5000	4420	88	1	80-120	25
Silver	ND	100	88.2	88	100	87.2	87	1	80-120	25
Sodium	ND	5000	4530	91	5000	4450	89	2	80-120	25
Vanadium	ND	100	90.5	90	100	89.5	89	1	80-120	25
Zinc	ND	100	88	88	100	87.5	88	1	80-120	25

METHOD 3050B/6010B
METALS BY ICP

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Client	: SHAW E&I	Date Collected:	NA
Project	: EL TORO, CTO 0024	Date Received:	11/14/02
SDG NO.	: 02K106	Date Extracted:	11/14/02 16:30
Sample ID:	MBLK1S	Date Analyzed:	11/15/02 15:07
Lab Samp ID:	IPK048SB	Dilution Factor:	1
Lab File ID:	I31K025028	Matrix	: SOIL
Ext Btch ID:	IPK048S	% Moisture	: NA
Calib. Ref.:	I31K025026	Instrument ID	: EMAXTI31

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PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Arsenic	ND	1	.21
Lead	ND	1	.174
Selenium	ND	1	.285
Thallium	ND	1	.305

RL: Reporting Limit

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
SDG NO.: 02K106
METHOD: METHOD 3050B/6010B

MATRIX:	SOIL			% MOISTURE:	NA
DILTN FACTR:	1	1	1		
SAMPLE ID:	MBLK1S				
CONTROL NO.:	IPK048SB	IPK048SL	IPK048SC		
LAB FILE ID:	I31K025028	I31K025029	I31K025030		
DATIME EXTRCTD:	11/14/0216:30	11/14/0216:30	11/14/0216:30	DATE COLLECTED:	NA
DATIME ANALYZD:	11/15/0215:07	11/15/0215:12	11/15/0215:17	DATE RECEIVED:	11/14/02
PREP. BATCH:	IPK048S	IPK048S	IPK048S		
CALIB. REF:	I31K025026	I31K025026	I31K025026		

ACCESSION:

PARAMETER	BLNK RSLT mg/kg	SPIKE AMT mg/kg	BS RSLT mg/kg	BS % REC	SPIKE AMT mg/kg	BSD RSLT mg/kg	BSD % REC	RPD %	QC LIMIT %	MAX RPD %
Arsenic	ND	100	93.5	94	100	94.1	94	1	80-120	25
Lead	ND	100	87.6	88	100	87.8	88	0	80-120	25
Selenium	ND	100	93.4	93	100	92.9	93	0	80-120	25
Thallium	ND	100	86.8	87	100	87	87	0	80-120	25

EMAX QUALITY CONTROL DATA
SERIAL DILUTION ANALYSIS

LIENT: SHAW E&I
ROJECT: EL TORO, CTO 0024
ATCH NO.: 02K106
ETHOD: METHOD 3010A/6010B

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ATRIX:	WATER		% MOISTURE:	NA
ILUTION FACTOR:	1	5		
AMPLE ID:	MN3002	MN3002DL		
MAX SAMP ID:	K054-02	K054-02T		
AB FILE ID:	I07K034020	I07K034021		
ATE EXTRACTED:	11/14/0214:10	11/14/0214:10	DATE COLLECTED:	11/06/02
ATE ANALYZED:	11/18/0216:25	11/18/0216:30	DATE RECEIVED:	11/07/02
REP. BATCH:	IPK046W	IPK046W		
ALIB. REF:	I07K034014	I07K034014		

CCESSION:

ARAMETER	SMPL RSLT (ug/L)	SERIAL DIL RSLT (ug/L)	DIF RSLT %	QC LIMIT (%)
luminum	177J	ND	NA	10
ntimony	ND	ND	0	10
rium	65.5J	64.7J	NA	10
eryllium	ND	ND	0	10
admium	ND	ND	0	10
lcium	28800	28600	1	10
romium	ND	ND	0	10
balt	ND	ND	0	10
opper	ND	ND	0	10
on	471J	474J	NA	10
gnesium	40700	39600	3	10
nganese	1630	1610	1	10
lybdenum	ND	ND	0	10
ckel	ND	ND	0	10
tassium	7250	6860J	NA	10
lver	ND	ND	0	10
dium	14900	13400	10	10
nadium	ND	ND	0	10
nc	ND	ND	0	10

EMAX QUALITY CONTROL DATA
SERIAL DILUTION ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: METHOD 3010A/6010B

==

MATRIX:	WATER		% MOISTURE:	NA
DILUTION FACTOR:	1	5		
SAMPLE ID:	MN3002	MN3002DL		
EMAX SAMP ID:	K054-02	K054-02T		
LAB FILE ID:	I31K025020	I31K025021		
DATE EXTRACTED:	11/14/0214:10	11/14/0214:10	DATE COLLECTED:	11/06/02
DATE ANALYZED:	11/15/0214:29	11/15/0214:34	DATE RECEIVED:	11/07/02
PREP. BATCH:	IPK046W	IPK046W		
CALIB. REF:	I31K025014	I31K025014		

ACCESSION:

PARAMETER	SMPL RSLT (ug/L)	SERIAL DIL RSLT (ug/L)	DIF RSLT %	QC LIMIT (%)
Arsenic	ND	ND	0	10
Lead	ND	ND	0	10
Selenium	ND	ND	0	10
Thallium	ND	ND	0	10

EMAX QUALITY CONTROL DATA
SERIAL DILUTION ANALYSIS

CLIENT:	SHAW E&I			
PROJECT:	EL TORO, CTO 0024			
ATCH NO.:	02K106			
ETHOD:	METHOD 3050B/6010B			

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ATRIX:	SOIL		% MOISTURE:	19.4
ILUTION FACTOR:	1	5		
SAMPLE ID:	818655-B3103	818655-B3103DL		
EMAX SAMP ID:	K106-01	K106-01T		
AB FILE ID:	I07K034031	I07K034032		
ATE EXTRACTED:	11/14/0216:30	11/14/0216:30	DATE COLLECTED:	11/12/02
ATE ANALYZED:	11/18/0217:22	11/18/0217:29	DATE RECEIVED:	11/12/02
REP. BATCH:	IPK048S	IPK048S		
ALIB. REF:	I07K034025	I07K034025		

CCESSION:

ARAMETER	SMPL RSLT (mg/kg)	SERIAL DIL RSLT (mg/kg)	DIF RSLT %	QC LIMIT (%)
luminum	7920	7990	1	10
ntimony	10.6	ND	NA	10
rium	196	197	1	10
eryllium	.328	ND	NA	10
admium	6.03	6	0	10
lcium	15100	15700	4	10
romium	50.5	52.9	5	10
obalt	7.85	7.23	8	10
opper	159	161	1	10
on	28500	30500	7	10
gnesium	3590	3670	2	10
nganese	242	254	5	10
olybdenum	10.6	10.6J	NA	10
ckel	27.1	30.7	13*	10
tassium	3460	3270	5	10
lver	ND	ND	0	10
dium	2940	2940	0	10
nadium	26.1	27.4	5	10
nc	2000	2130	6	10

EMAX QUALITY CONTROL DATA
SERIAL DILUTION ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
BATCH NO.: 02K106
METHOD: METHOD 3050B/6010B

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MATRIX:	SOIL		% MOISTURE:	19.4
DILUTION FACTOR:	1	5		
SAMPLE ID:	818655-B3103	818655-B3103DL		
EMAX SAMP ID:	K106-01	K106-01T		
LAB FILE ID:	I31K025032	I31K025033		
DATE EXTRACTED:	11/14/0216:30	11/14/0216:30	DATE COLLECTED:	11/12/02
DATE ANALYZED:	11/15/0215:27	11/15/0215:34	DATE RECEIVED:	11/12/02
PREP. BATCH:	IPK048S	IPK048S		
CALIB. REF:	I31K025026	I31K025026		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SERIAL DIL RSLT (mg/kg)	DIF RSLT %	QC LIMIT (%)
Arsenic	6.98	7.81	12*	10
Lead	1430	1480	4	10
Selenium	1.29	2.81J	NA	10
Thallium	ND	ND	0	10

EMAX QUALITY CONTROL DATA
ANALYTICAL SPIKE ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
SDG NO.: 02K106
METHOD: METHOD 3010A/6010B

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MATRIX:	WATER		% MOISTURE:	NA
DILTN FACTR:	1	1		
SAMPLE ID:	MN3002			
CONTROL NO.:	K054-02	K054-02A		
LAB FILE ID:	I07K034020	I07K034019		
DATIME EXTRCTD:	11/14/0214:10	11/14/0214:10	DATE COLLECTED:	11/06/02
DATIME ANALYZD:	11/18/0216:25	11/18/0216:20	DATE RECEIVED:	11/07/02
PREP. BATCH:	IPK046W	IPK046W		
CALIB. REF:	I07K034014	I07K034014		

ACCESSION:

PARAMETER	SMPL RSLT (ug/L)	SPIKE AMT (ug/L)	AS RSLT (ug/L)	AS % REC	QC LIMIT (%)
Aluminum	177J	10000	9180	90	75-125
Antimony	ND	5000	4240	85	75-125
Barium	65.5J	1000	898	83	75-125
Beryllium	ND	1000	903	90	75-125
Cadmium	ND	1000	893	89	75-125
Calcium	28800	50000	70900	84	75-125
Chromium	ND	1000	885	89	75-125
Cobalt	ND	1000	860	86	75-125
Copper	ND	1000	892	89	75-125
Iron	471J	10000	9110	86	75-125
Magnesium	40700	50000	83400	85	75-125
Manganese	1630	1000	2400	77	75-125
Molybdenum	ND	1000	837	84	75-125
Nickel	ND	1000	863	86	75-125
Potassium	7250	50000	51800	89	75-125
Silver	ND	1000	897	90	75-125
Sodium	14900	50000	58400	87	75-125
Vanadium	ND	1000	880	88	75-125
Zinc	ND	1000	904	90	75-125

EMAX QUALITY CONTROL DATA
ANALYTICAL SPIKE ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
SDG NO.: 02K106
METHOD: METHOD 3010A/6010B

==

MATRIX:	WATER		% MOISTURE:	NA
DILTN FACTR:	1	1		
SAMPLE ID:	MN3002			
CONTROL NO.:	K054-02	K054-02A		
LAB FILE ID:	I31K025020	I31K025019		
DATIME EXTRCTD:	11/14/0214:10	11/14/0214:10	DATE COLLECTED:	11/06/02
DATIME ANALYZD:	11/15/0214:29	11/15/0214:24	DATE RECEIVED:	11/07/02
PREP. BATCH:	IPK046W	IPK046W		
CALIB. REF:	I31K025014	I31K025014		

ACCESSION:

PARAMETER	SMPL RSLT (ug/L)	SPIKE AMT (ug/L)	AS RSLT (ug/L)	AS % REC	QC LIMIT (%)
Arsenic	ND	1000	950	95	75-125
Lead	ND	1000	881	88	75-125
Selenium	ND	1000	981	98	75-125
Thallium	ND	1000	884	88	75-125

EMAX QUALITY CONTROL DATA
ANALYTICAL SPIKE ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
SDG NO.: 02K106
METHOD: METHOD 3050B/6010B

MATRIX:	SOIL		% MOISTURE:	19.4
DILTN FACTR:	1	1		
SAMPLE ID:	818655-B3103(COMPOSITE)			
CONTROL NO.:	K106-01	K106-01A		
LAB FILE ID:	I07K034031	I07K039017		
DATIME EXTRCTD:	11/14/0216:30	11/14/0216:30	DATE COLLECTED:	11/12/02
DATIME ANALYZD:	11/18/0217:22	11/20/0219:27	DATE RECEIVED:	11/12/02
PREP. BATCH:	IPK048S	IPK048S		
CALIB. REF:	I07K034025	I07K039015		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SPIKE AMT (mg/kg)	AS RSLT (mg/kg)	AS % REC	QC LIMIT (%)
Aluminum	7920	1240	9340	114	75-125
Antimony	10.6	620	512	81	75-125
Barium	196	124	306	89	75-125
Beryllium	.328	124	112	90	75-125
Cadmium	6.03	124	111	84	75-125
Calcium	15100	6200	20800	93	75-125
Chromium	50.5	124	158	86	75-125
Cobalt	7.85	124	109	81	75-125
Copper	159	124	273	92	75-125
Iron	28500	1240	30400	148*	75-125
Magnesium	3590	6200	9120	89	75-125
Manganese	242	124	349	86	75-125
Molybdenum	10.6	124	112	82	75-125
Nickel	27.1	124	128	81	75-125
Potassium	3460	6200	9200	93	75-125
Silver	ND	124	106	86	75-125
Sodium	2940	6200	8600	91	75-125
Vanadium	26.1	124	134	87	75-125
Zinc	2000	124	2120	91	75-125

EMAX QUALITY CONTROL DATA
ANALYTICAL SPIKE ANALYSIS

CLIENT: SHAW E&I
PROJECT: EL TORO, CTO 0024
SDG NO.: 02K106
METHOD: METHOD 3050B/6010B

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MATRIX:	SOIL		% MOISTURE:	19.4
DILTN FACTR:	1	1		
SAMPLE ID:	818655-B3103			
CONTROL NO.:	K106-01	K106-01A		
LAB FILE ID:	I31K025032	I31K025031		
DATIME EXTRCTD:	11/14/0216:30	11/14/0216:30	DATE COLLECTED:	11/12/02
DATIME ANALYZD:	11/15/0215:27	11/15/0215:22	DATE RECEIVED:	11/12/02
PREP. BATCH:	IPK048S	IPK048S		
CALIB. REF:	I31K025026	I31K025026		

ACCESSION:

PARAMETER	SMPL RSLT (mg/kg)	SPIKE AMT (mg/kg)	AS RSLT (mg/kg)	AS % REC	QC LIMIT (%)
Arsenic	6.98	124	119	90	75-125
Lead	1430	124	1470	29*	75-125
Selenium	1.29	124	113	90	75-125
Thallium	ND	124	102	82	75-125

APPENDIX E
LDC REPORT

The DV Group, Inc.

DATA VALIDATION REPORT

Project / Site Name:	MCAS El Toro, CTO #24
Project No.:	818655
Data Reviewer:	S. Obleas, The Data Validation Group, Inc.
Review Date:	December 12, 2002
Matrix:	6 Soils / 2 Waters
Parameters:	M8015 Gasoline and Diesel; Volatiles 8260B; Semivolatiles 8270C; Semivolatiles-SIM 8270C; PCBs 8082; Pesticides 8081A; Mercury 7470/7471A; Metals 6010B.
Validation Level:	EPA Level III
Laboratory:	EMAX Analytical Lab Inc.
Sample Delivery Group (SDG) No.:	02K106
Sample Nos.:	818655-B3105 818655-B3110 818655-B3106 818655-B3111 818655-B3107 818655-B3113 818655-B3109 818655-B3114
Collection Date(s):	November 12, 2002
Comments:	Field duplicates: not performed. Trip Blank: 818655-B3105 Equipment rinsate: 818655-B3111

The data were qualified according to the U.S. Environmental Protection Agency (EPA) documents "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (1999) and "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (1994). In addition, the Data Validation Services Statement of Work for MCAS El Toro was used along with other EPA methods.

SRObleas President

S.R. Obleas, President

DATA VALIDATION REQUIREMENTS

Level IV or Full validation includes all parameters listed below. Level III or Cursory validation parameters are indicated by an asterisk (*).

CLP Organic Parameters

- * Holding times
- GC/MS instrument performance check
- * Initial and continuing calibrations
- * Blanks
- * Surrogate recovery
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample or blank spike
- * Field duplicates
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall assessment of data for the SDG

CLP Inorganic Parameters

- * Holding times
- * Initial and continuing calibrations
- * Blanks
- * Matrix spike
- * Laboratory control sample/blank spike
- * Field duplicates
- * Matrix duplicates
- ICP interference check sample
- GFAA quality control
- * ICP serial dilution
- Sample result verification
- Analyte quantitation
- Reported detection limits
- * Overall assessment of data for the SDG

Non-CLP Organic and Inorganic Parameters

- * Method compliance
- * Holding times
- * Initial and continuing calibrations
- * Blanks
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample or blank spike
- * Field duplicates
- * Matrix duplicates
- * Surrogate recovery
- Analyte quantitation
- Reported detection limits
- * Overall assessment of data for the SDG

DATA VALIDATION QUALIFIERS

U Indicates the compound or analyte was analyzed for but no detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore, qualification was not required

CURSORY DATA VALIDATION SUMMARY TABLE

Analysis	Holding Times	Surrogates	MS/MSD	LCS	Blanks	Calibration	Internal Standards	Field Duplicates	Other
Method M8015 **Gasoline**	√	√	N/A	√	√	√	N/A	N/A	√
Method M8015 **Diesel**	√	√	√	√	√	√	N/A	N/A	√
Method 8260B **Volatiles**	√	√	N/A	√	√	√	√	N/A	√
Method 8270C **Semivolatiles**	√	√	√	√	√	√	√	N/A	√
Method 8270C **Semivolatiles-SIM**	√	√	√	√	√	√	√	N/A	√
Method 8082 **PCBs**	√	√	√	√	√	√	N/A	N/A	√
Method 8081A **Pesticides**	√	√	**Pg. 5**	√	√	**Pg. 5**	N/A	N/A	**Pg. 6**
Method 7470A/7471A **Mercury**	√	N/A	√	√	√	√	N/A	N/A	√
Method 6010B **Metals**	√	N/A	**Pg. 7, 8**	√	**Pg. 7**	√	N/A	N/A	**Pg. 8**

Notes:

√ indicates that all quality control criteria were met for the parameter as specified in the prescribed methods and data validation guidelines.

N/A indicates the parameter is not applicable to an analysis.

If criteria were not met and the data were qualified, a page number is indicated where the qualification is detailed.

The data were evaluated for all validation criteria and were found to be in control except where noted. Any outliers are described in the text.

DATA ASSESSMENT

GASOLINE (Method M8015)

I. Cursory criteria met.

DIESEL (Method M8015)

I. Cursory criteria met.

VOLATILES (Method 8260B)

I. Cursory criteria met.

SEMIVOLATILES (Method 8270C)

I. Cursory criteria met.

SEMIVOLATILES-SIM (Method 8270C)

I. Cursory criteria met.

PCBS (Method 8082)

I. Cursory criteria met.

PESTICIDES (Method 8081A)

I. Matrix spike

A The following did not meet QC limits for soil sample 818655-B3114 Qualifications to the data were not made.

Compound	QC limits	MS%R	MSD%R	RPD
alpha-BHC	65-135 / 50	45 *	79	55 *
gamma-BHC	63-130 / 50	51 *	76	39
delta-BHC	65-136 / 50	62 *	88	35
Aldrin	37-126 / 50	47	89	62 *
Heptachlor epoxide	43-144 / 50	47	85	58 *
gamma-Chlordane	31-133 / 50	48	84	55 *
alpha-Chlordane	31-135 / 50	47	87	60 *
Endosulfan I	39-153 / 50	42	82	65 *
4,4'-DDE	35-149 / 50	58	98	51 *
Dieldrin	32-142 / 50	40	79	66 *
Endosulfan II	65-169 / 50	62 *	90	37
Endrin aldehyde	65-160 / 50	60 *	98	48
Methoxychlor	63-152 / 50	57 *	98	53 *

II. Calibrations

A. Due to continuing calibration problems, the following nondetected results are qualified as estimated (UJ).

- Heptachlor, Endrin, 4,4'-DDT, Methoxychlor in samples 818655-B3106, 818655-B3109, and 818655-B3110.

The following continuing calibrations had percent differences (%D) of >15%.

Calibration Date	Compound	%D
11/16/02 1311	Heptachlor	-21
RTX-CLPEST	Endrin	-35
	4,4'-DDT	-26
	Methoxychlor	-22
11/16/02 1311	Heptachlor	-25
RTX-CLPESTII	Endrin	-31
	4,4'-DDT	-36
	Methoxychlor	-27

III. Compound Identification

A. Due to confirmation problems, the following results are considered nondetected (UJ).

- alpha-BHC in samples 818655-B3106 and 818655-B3110.

The result reported was detected below the RL, and a percent difference (%D) greater than 50% was noted in the analyte concentration between the quantitation column and the confirmation column. The %Ds are listed below.

Sample ID	Compound	%D	Reported Conc.	Modified Final Conc.
818655-B3106	alpha-BHC	69	0.00076 J	0 0025 UJ
818655-B3110	alpha-BHC	224	0.0011 J	0 0023 UJ

MERCURY (Method 7470A/7471A)

I. Cursory criteria met.

METALS (Method 6010B)

I. Blank Contamination

A Due to calibration and method blank contamination, the following results are considered nondetected (U)

- Iron in sample 818655-B3111.
- Selenium in samples 818655-B3106, 818655-B3107, 818655-B3110, and 818655-B3113.

The following metals were detected in the associated calibration and method blanks at the concentrations noted below

Analyte	Blank ID	Concentration, units
Iron	ICB	18.8 ug/L; 1.88 mg/Kg
Selenium	CCB2	5.84 ug/L; 0.584 mg/Kg

Detected results less than 5x the maximum blank contamination were qualified.

B Due to equipment rinsate blank contamination, the following results are considered nondetected (U).

- Sodium in samples 818655-B3106, 818655-B3107, 818655-B3109, 818655-B3110, 818655-B3113, and 818655-B3114.

The following analytes were detected in the associated field, trip, and equipment rinsate blanks at the concentrations noted below

Analyte	Blank ID	Concentration, units
Sodium	818655-B3111 (equipment rinsate)	4710 ug/L; 471 mg/Kg

Detected results less than 5x the maximum blank contamination were qualified

II. Analytical Spike

A Due to accuracy problems, the following detected results are qualified as estimated (J).

- Lead in samples 818655-B3106, 818655-B3107, 818655-B3109, 818655-B3110, 818655-B3113, and 818655-B3114

The recoveries outside the QC limits are listed below.

Sample ID	Analyte	%R	QC Limits
818655-B3103	Lead	29.0	75 - 125%

Spike recoveries less than 74% indicate that detects may be biased low and false nondetects may have been reported.

B. Due to accuracy problems, the following detected results are qualified as estimated (J).

- Iron in samples 818655-B3106, 818655-B3107, 818655-B3109, 818655-B3110, 818655-B3113, and 818655-B3114.

The recoveries outside the QC limits are listed below.

Sample ID	Analyte	%R	QC Limits
818655-B3103	Iron	148	75 - 125%

Spike recoveries above 125% indicate that detected results may be biased high.

III. Serial Dilution

A. Due to serial dilution problems, the following detected results are qualified as estimated (J).

- Arsenic and Nickel in samples 818655-B3106, 818655-B3107, 818655-B3109, 818655-B3110, 818655-B3113, and 818655-B3114.

The percent difference between the original sample result and the dilution result was outside the QC limits of 10% for analyte concentrations as shown below.

Sample ID	Analyte	%D
818655-B3103	Arsenic	12
	Nickel	13

MCAS El Toro, CTO 24
Gasoline – Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Gasoline – Laboratory Blank Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Diesel – Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Diesel – Laboratory Blank Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Volatiles – Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Volatiles – Laboratory Blank Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Semivolatiles – Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Semivolatiles – Laboratory Blank Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Semivolatiles-SIM – Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Semivolatiles-SIM – Laboratory Blank Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
PCBs – Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
PCBs – Laboratory Blank Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Pesticides – Data Qualification Summary – SDG 02K106

Continuing Calibration qualifications

Sample	Compound	Qualification	Protocol / Advisory
818655-B3106	Heptachlor Endrin 4,4'-DDT Methoxychlor	UJ UJ UJ UJ	Protocol Protocol Protocol Protocol
818655-B3109	Heptachlor Endrin 4,4'-DDT Methoxychlor	UJ UJ UJ UJ	Protocol Protocol Protocol Protocol
818655-B3110	Heptachlor Endrin 4,4'-DDT Methoxychlor	UJ UJ UJ UJ	Protocol Protocol Protocol Protocol

Compound Identification qualifications

Sample	Compound	Modified Final Conc.	Qualification	Protocol / Advisory
818655-B3106	alpha-BHC	0.0025	UJ	Protocol
818655-B3110	alpha-BHC	0.0023	UJ	Protocol

MCAS El Toro, CTO 24
Pesticides – Laboratory Blank Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Mercury – Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Mercury – Laboratory Blank Data Qualification Summary – SDG 02K106

No Sample Data Qualified in this SDG

MCAS El Toro, CTO 24
Metals – Data Qualification Summary – SDG 02K106

Analytical Spike qualifications

Sample	Compound	Qualification	Protocol / Advisory
818655-B3106	Iron	J	Protocol
	Lead	J	Protocol
818655-B3107	Iron	J	Protocol
	Lead	J	Protocol
818655-B3109	Iron	J	Protocol
	Lead	J	Protocol
818655-B3110	Iron	J	Protocol
	Lead	J	Protocol
818655-B3113	Iron	J	Protocol
	Lead	J	Protocol
818655-B3114	Iron	J	Protocol
	Lead	J	Protocol

Serial Dilution qualifications

Sample	Compound	Qualification	Protocol / Advisory
818655-B3106	Arsenic	J	Protocol
	Nickel	J	Protocol
818655-B3107	Arsenic	J	Protocol
	Nickel	J	Protocol
818655-B3109	Arsenic	J	Protocol
	Nickel	J	Protocol
818655-B3110	Arsenic	J	Protocol
	Nickel	J	Protocol
818655-B3113	Arsenic	J	Protocol
	Nickel	J	Protocol
818655-B3114	Arsenic	J	Protocol
	Nickel	J	Protocol

MCAS El Toro, CTO 24
Metals – Laboratory Blank Data Qualification Summary – SDG 02K106

Laboratory Blank qualifications

Compound	Associated Samples	Qualification	Protocol / Advisory
Iron	818655-B3111	U	Advisory
Selenium	818655-B3106	U	Advisory
	818655-B3107	U	Advisory
	818655-B3110	U	Advisory
	818655-B3113	U	Advisory

Equipment rinsate qualifications

Compound	Associated Samples	Qualification	Protocol / Advisory
Sodium	818655-B3106	U	Advisory
	818655-B3107	U	Advisory
	818655-B3109	U	Advisory
	818655-B3110	U	Advisory
	818655-B3113	U	Advisory
	818655-B3114	U	Advisory

OVERALL ASSESSMENT OF DATA

I. Method Compliance and Additional Comments

A All analyses were conducted within all specifications of the requested methods

II. Usability

A Due to continuing calibration problems in the Pesticide analysis, the following were qualified as estimated: Heptachlor, Endrin, 4,4'-DDT and Methoxychlor for three samples alpha-BHC was qualified as estimated for two samples due to high percent difference between the primary and secondary columns.

B. Due to calibration blank contamination in the Metals analysis, the following were considered nondetected: Iron for one sample; Selenium for four samples. Due to equipment rinsate contamination, the following were considered nondetected: Sodium for six samples. Due to accuracy problems, Iron and Lead were qualified as estimated for six samples. Arsenic and Nickel were qualified as estimated for six samples due to serial dilution problems.

C. The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be rejected (R) are unusable for all purposes. Sample results that were found to be estimated (J) are usable for limited purposes only Based upon the cursory and full data validation all other results are considered valid and usable for all purposes In general, the absence of rejected data and the small number of qualifiers added to the data indicate high usability.